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FINAL REPORT

COMPARISON OF JIMSPHERE AND RAWINSONDE WIND SHEARS

by

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ABSTRACT

Characteristics of the wind shear for 25 meter layers were prepared from a series of 175 detailed wind ascents to 18 km taken with a Jimsphere balloon followed by FPS-16 radar from November 1964 to June 1965. To determine how well the shears for small layers could be estimated from rawinsonde data, two new sets of ascents were created from the original Jimsphere data. One set consisted of wind data at 23 levels corresponding only to standard pressure levels, and the other set at the 46 "minute" levels at which winds are reported on observational forms. The differences in results were thus due only to the differing vertical resolution in the three series.

The results showed that the magnitudes of the mean pressure and minute shears for 25 meters are smoothed to about 1/3 and 1/2 respectively of the Jimsphere shears. Graphs of corrections for pressure and minute data needed to approximate the Jimsphere shear are presented both in terms of thickness of layer, and, for 25 m as a function of height.

The regressions proposed by Essenwanger between the mean, or the standard deviation, of the shear and the mean thickness of the layer, and also between the standard deviation and the mean of the shear are confirmed in principle using Jimsphere data.

Tabulations of bivariate frequency distributions (direction change vs magnitude), means and standard deviations of five parameters relating Jimsphere shears and winds to those of pressure and minute data, by 2 km layers, are included, both for the total data sample and for the time

changes in a sub-set consisting of 59 pairs of observations taken from 1-4 hours apart.

The mean Jimsphere shear for a 25 meter layer increases from 0.3 m/sec at the lowest levels to 0.5 at 11 km and to 0.8 at 17 km, with a standard deviation of about 70% of the mean.

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I. Introduction

t is necessary, for certain applications, to know the value of the vertical shear of the horizontal wind at very fine altitude increments. As this information is not normally available, it must be estimated from usual rawinsonde or radio wind observations.

Using a special series of high resolution wind observations from FPS-16 radar tracking of a Jimsphere balloon, this study attempts to estimate the wind shear for 25 meter layers from usual rawinsonde data and compares results with those of other papers. As a second part of this paper, statistics of the shears for 25 meter layers are presented.

II. Data

The best available data for this research is the series of special wind observations taken at Cape Kennedy using a specially designed aluminized balloon with roughened surface, called a "Jimsphere" and tracked at 0.1 second intervals by FPS-16 radar. The data consists of 175 ascents from November 1964 to June 1965, each reporting about 700 levels between about 300 m and 18 km near which altitude the Jimsphere floats. The winds are smoothed by a least squares fit over a 50 meter layer and presented at each 25 meters. One hundred twelve of the 175 ascents have been published (Scoggins and Susko, 1965). All data used were made available by NASA, Huntsville.

A theoretical study (Scoggins, 1963) of accuracy of measurement indicated an RMS error in wind data of about 1 m/sec, but depended

upon unknown errors in radar tracking. An evaluation based upon simultaneous observation by two radars yielded RMS errors in wind speed generally less than 0.5 m/sec, although occasional large errors can appear (Scoggins and Susko, 1965).

To compare this fine-scale data with rawinsonde observations, the latter were simulated by extracting Jimsphere data only at height corresponding to (1) standard pressure surfaces, and to (2) those heights reported in maximum available detail on the original computation forms (WBAN-20). The relative information content of these three sources in the lowest 18 km is shown in Table I and the equivalent levels used are shown in Table II.

By confining the data to that of a single source and simulating the other sources by degrading the vertical resolution of the Jimsphere data, we can attribute differences in resulting shears to the effect of resolution alone. Had actual rawin data for the same station and day been used, there would have been additional differences which could be caused by the observations being taken at different time and location and by using different observational methods. While it would be desirable also to isolate the effect of the differing amount of smoothing in the two forms of observation which arise from the single reading once a minute and the average instantaneous readings while the balloon ascends a 50 meter layer, this can not be done with the available data.

The Jimsphere data were used to prepare three separate sets of ascents:

Table I: Relative Detail of Three Types of Available Data up to 18 km

Source	Vertical Resolution	No. of levels
Jimsphere	Overlapping 50 meter means, given each 25 meters	720
Rawin (WBAN-20 original record)	1 min. to 7 km (approx. 300 m) 2 min. above 7 km (500-1000m)	46
Rawin (Standard pressure levels)	50 mb to 12 km (500m) 20 mb to 18 km (1000m)	23

1. The original 25 meter Jimsphere data for some 700 levels. (J)

2. Jimsphere data for some 23 fixed heights corresponding to the annual mean height of the 23 standard pressure surfaces from the surface to 80 mb (17,900 m) at Cape Kennedy. (P)

3. Jimsphere data for 46 levels corresponding to those represented by one or two minute data on WBAN-20 for Cape Kennedy. (M)

As constant pressure or regular minute data are the only data normally available from which to estimate shears, it was desired to see how well they could do so, using simplest methods. From the latter two sets of data, winds were estimated at each 25 meter level using only linear interpolation. The differences of the estimated shears using the crude pressure-level or minute data, from the actual Jimsphere shears, provide the relative error or "correction factors" to obtain the average shears for shallow layers from generally available data. For this first attempt only linear interpolation was used; the use of higher order fitting methods might have reduced the differences at the expense of more complicated computations. In any event, the derived shears will always be smaller than those from the original detailed data and the differences will depend upon the interpolation method used.

At those levels for which pressure (or minute) data are available, and for which no interpolation is needed, a zero error exists between 25 meter data and original Jimsphere data. In all statistics, these non-interpolated levels are therefore excluded in computations of error.

Table II: Equivalent Jimsphere Levels to Rawinsonde Pressure and Minute Data

23 Pressure Data Levels		46 Minute Data Levels	
mb	meters	meters	meters
S	0	525	7025
1000	150	900	7525
950	600	1275	8075
900	1075	1600	8575
850	1575	1900	9075
800	2075	2200	9550
750	2625	2525	10050
700	3200	2800	10525
650	3800	3050	11075
600	4450	3300	11600
550	5125	3600	12100
500	5875	3825	12625
450	6700	4050	13125
400	7600	4300	13425
350	8575	4525	13700
300	9675	4775	13950
250	10925	5025	14500
200	12375	5250	15100
175	13225	5500	15700
150	14175	5750	16250
125	15275	6000	16825
100	16575	6225	17375
80	17900	6500	17950

For convenience, the following notation will be used:

J = Original detailed Jimsphere wind
P = Equivalent Constant Pressure wind
M = Equivalent Minute wind
JS, PS, MS = Jimsphere, Pressure, Minute vector shear
Subscript s = Magnitude of wind or shear vector
Subscript d = Difference in the directions of wind or of shear vectors
F.D. = Frequency distribution
σ or S.D. = Standard Deviation
Δ = time change

Bivariate frequency distributions, means and standard deviations of the five basic parameters below were computed for 2 km layers for the consolidated 175 ascents. These tabulations are reproduced in Appendix A. The means and deviations were also plotted by computer for each 25 meter level.

1. $(JS)_s$
2. $(J - P)_s$
3. $(J - M)_s$
4. $(JS - PS)_s$
5. $(JS - MS)_s$

To evaluate short-period time changes, some 59 pairs of observations taken from one to four hours apart, were also processed in the same manner. The summaries are given as Appendix B.

Direction change statistics were first separated into clockwise and counter-clockwise to see if persistent patterns of wind interpolation

error, or if shear existed. As no significant differences were found by level, all direction changes were treated without regard to sign.

To keep the size of this report within practical limits, most parameters are tabulated in the Appendix summarized for 2 km layers. Other detailed tabulations are available but are only shown graphically here. For simplicity, the symbolic form of each parameter will be used in the discussion.

III. Results

A. Estimating fine-scale shear from rawinsonde data

The differences in the shear indicated by the estimated data, from Jimsphere original data are shown in Figs. 1-14. Fig. 1 shows the variation with height of $\overline{(JS)_s - (PS)_s}$ for each 25 meter increment. There is a general increase with height of the error from 0.3 m/sec/25m at 1 km to about 1 m/sec at 17 km. The corresponding standard deviations in Fig. 2 show the same increase with height with values about 60% of the means. The numerous peaks in the deviation profile are caused by occasional, extreme shears although no physical reason is known for these occasional, large values. Separate frequency distributions were made at each 25 m level, for all basic parameters, and each peak in the deviation profile curves (Figs. 2, 4, 22) could always be traced to the occurrence of a single shear generally in the classes 4-6 or 6-8 m/sec/25m. Those as large as 5 m/sec are discussed separately below. One large occurrence, compared to the 140 to 170 instances in the classes

less than 2 m/sec is sufficient to cause these noticeable peaks. Figs. 3 and 4 are almost identical to Figs. 1 and 2, and, as will be seen, Figs. 1 and 3 are almost the same as Fig. 21, the Jimsphere shear itself. It might thus appear that both $\overline{(PS)}_s$ and $\overline{(MS)}_s$ are relatively very small compared to $\overline{(JS)}_s$. However, in Figs. 5 and 6, the values of $\overline{(PS)}_s$ and $\overline{(MS)}_s$ are seen to be larger than one would expect from the differences of Figs. 1 and 3 from Fig. 21. This is because the mean of the difference in magnitude of pairs of vectors includes the unknown contributions of the varying direction changes of corresponding pairs as well as magnitude changes. The mean of $(PS)_s$ or $(MS)_s$ is therefore not derivable indirectly from other parameters and must be computed from the original observations.

The mean errors and deviations in interpolating winds from the P and M data are shown in Figs. 7-10. At levels for which P and M data exist there is of course no error and hence the curve has a serrated appearance. The errors normally increase with height but an exception to this occurs near 13 km where the vertical resolution of the P, and especially of the M, data is increased, which causes a reduction in interpolation error. The maximum errors from the M winds are about one-half those of the P winds due to the doubled density of M data with height. Another property of the PS and MS data is the discontinuous changes of layers with constant shear with height, shown in Figs. 5 and 6, caused by linear interpolation between given data levels.

One of the principal aims of this study is to approximate the JS from PS or MS. To consolidate the results of Figs. 1-10, the data in

Figs. 11-14 show the variation with height of the relative error, defined as:

$$\frac{(JS)_s - (PS)_s}{(PS)_s} \quad \text{and} \quad \frac{(JS)_s - (MS)_s}{(MS)_s}$$

This can be applied to usual pressure data to estimate the finer scale shear.

The values of relative error indicate the percentage to be added to the $(PS)_s$ or $(MS)_s$ values. Hence if Fig. 11 indicates a relative error of, say, 3, then the $(JS)_s$ is 4 times the $(PS)_s$. Thus Figs. 11 and 13 show that $(JS)_s$ varies from 3 to 5 time the $(PS)_s$ and from 2.5 to 3.5 times the $(MS)_s$ data. The standard deviations of $(JS)_s$ range from 2.5 to 3.5 times $(PS)_s$ and from 2.25 to 3 times $(MS)_s$ data. The minimum error near 13 km shows up in the mean relative error of $(MS)_s$ graph also.

As $\overline{(PS)}_s$ and $\overline{(MS)}_s$ are sometimes very small, the relative error computations occasionally yielded exceedingly large ratios when individual values of $(PS)_s$ or $(MS)_s$ approached zero. To avoid these extreme values, the results in Figs. 11-14 were smoothed by eliminating values of PS or MS less than 0.05 m/sec/25m. Approximately 10-15% of the observations were eliminated in this way. Thus, when $(PS)_s$ or $(MS)_s$ is near zero, correction factors can not be applied. However, it is probably reasonable to assume that in most instances, when $(PS)_s$ or $(MS)_s$ is near zero $(JS)_s$ is also.

Naturally these results are applicable only to Cape Kennedy. However, as no other comparative data exists for other stations (except Point Mugu

and Wallops Island), it may be necessary to use these estimates elsewhere as a first approximation.

B. Relationship of shear to layer thickness

In his study of this problem, for application to missile response, Essenwanger (1963) has found that the magnitude of the mean shear can be related simply to the thickness of the layer through which it is measured:

$$\bar{S} = A_o + a_o (\triangle z)^{a_1}$$

where $\bar{S}$ is mean shear, $\triangle z$ is layer thickness, A_o, a_o, a_1 are constants which depend on atmospheric conditions which change with season. This result appears valid only if the data are averages of all non-overlapping layers of an arbitrary thickness throughout each ascent, and for many ascents. For example, each ascent to 30 km would provide 30-1 km layers, 20-1.5 km layers, 60-500 meter layers, etc. The relationship appears to be independent of how the wind increases or decreases with height. Essenwanger's results for Cape Kennedy derived from rocket response measurements have been confirmed by Armendariz and Rider (1966) using independent photo-theodolite observations of a pibal balloon at White Sands. The coefficients in the relationship vary with place and month as would be expected from inherent differences in the wind profiles and the type of smoothing used in processing the raw observations.

Using the consolidated 175 Jimsphere ascents, over a seven month period, the regression curve (3) in Fig. 15 was obtained with $a_o = 0.058$ and $a_1 = 0.68$ which agrees reasonably well with those of Essenwanger's data for February and July (Essenwanger and Billions (1965).

As specially observed, fine-scale, data are not normally available, an attempt was also made to see how well such a regression curve could be established using only rawinsonde constant pressure data. To obtain a wide range of thickness, the linearly interpolated data for 25 meter levels were used in the averaging as pressure surfaces are at least 500 meters apart and could not provide points at the shorter thickness half of the scale. Also, had only the levels equivalent to all the reporting pressure levels in an ascent been used, the thickness between them would almost always be different and thus the consolidated time means would only represent a time average of a certain layer at a particular height. Although regressions could be based on such data, the method used was chosen to make results comparable with Essenwanger's.

The resulting curves are shown in Fig. 16 which demonstrates how much $\overline{(PS)}_s$ and $\overline{(MS)}_s$ underestimate $\overline{(JS)}_s$. For 25 meter layers, the $\overline{(JS)}_s$ is about twice that of $\overline{(MS)}_s$ and three times that of $\overline{(PS)}_s$. The errors naturally decrease as the layer thickness increases towards values approaching the thicknesses between the observed standard pressure and 1 or 2 minute levels. However, it seems possible that once the relationship is established from temporary Jimsphere ascents, $\overline{(PS)}_s$ or $\overline{(MS)}_s$ data can be used to estimate finer-scale mean shears. It is interesting to note that the exponents of the power function tend to increase with the increase of smoothing.

In the theoretical development by Essenwanger (1963) the standard deviation plus a constant A_o is also related to a power function of the thickness. The constant is determined from the intercept in the regression between the standard deviation and the mean (for example, as in Fig.

24). However, Armendariz and Rider (1966) show a linear relation without a constant. In our data it appears from a comparison of regressions similar to those in Fig. 24 for $(PS)_s$ and $(MS)_s$, that the constant is very close to zero and thus is not needed in this particular instance. Fig. 17 shows $\sigma(JS)_s$ with a constant for comparison with Essenwanger's regressions, and Fig. 17A shows $\sigma(JS)_s$ without the constant for comparison with Armendariz's regressions. The coefficient changes slightly if the constant is not used. Fig. 18 compares $\sigma(JS)_s$ with $\sigma(PS)_s$ and $\sigma(MS)_s$ not employing a constant.

As the regressions have been drawn by eye here, a closer fit by numerical methods would change the coefficients also. Further, it seems possible from some of our data that a polynomial might provide a better fit than a straight line which was used for the sake of uniform comparison with the literature. This can only be decided by large samples of independent data from various sources.

The agreement of these various regressions is evidently dependent on location, season and probably altitude range, as well as the degree of smoothing employed in data reduction. Only analysis of additional data using a single type of observation, taken frequently at different locations and seasons, will help identify the contribution of these factors.

C. Direction change with height

To help evaluate the magnitudes of the shear differences discussed already, that portion of the shear which is due to the rotation

of the wind is shown in Fig. 19 as a frequency distribution of $(JS - PS)_d$ for 2 km layers. Fig. 20 does the same for $(JS - MS)_d$. In both instances the direction differences are smallest near 10 km and largest both near the surface layer and at the highest layer.

D. Properties of 25 meter shears from Jimsphere data

Fig. 21 shows that $\overline{(JS)}_s$ is about 0.3 m/sec/25m from C-9 km, and then increases to about 0.8 m/sec/25m at 17 km. Fig. 22, of the standard deviation, shows a similar pattern but reveals numerous sharp peaks, especially about 8 km. Many of these are due to single occurrences of extreme shears which hardly affect the mean at the level but are large enough to be outstanding in terms of standard deviation. A frequency distribution of $\overline{(JS)}_s$ by 2 km layers in Fig. 23 shows how the larger shear classes increase with height. The frequency curves for layers below 10 km show similar shapes with peak values in the minimum class (0-0.25 m/sec/25m). This peak frequency shifts to 0.50-0.75 m/sec/25m at 16-18 km.

A linear relation of $\overline{(JS)}_s$ to its standard deviation was also pointed out by Essenwanger (1963). In Fig. 24, the slope of the Jimsphere regression is .65 which is less than the .78 of his rocket data. The rocket data are for unspecified months and period of record which may help account for the appreciable discrepancy at higher values of shear.

E. Extreme shears

Table III shows the source of all observations of shears greater than 5.0 m/sec/25m. Examination of the original 50 meter average wind

Table III: Extreme Jimsphere Shears (≥5.0 m/sec/25m)

Date	Time	Level (m)	Magnitude (m/sec/25m)
1/4/65	0104Z	7475	9.4
		7525	5.3
		7550	5.3
1/13/65	2137	2600	7.0
		2650	8.1
	2237	13025	6.4
1/23/65	0100	8950	5.0
		10175	6.0
		10575	8.8
2/24/65	2029	15400	5.3
	2150	15800	6.6
2/25/65	0025	15975	5.6
		16550	5.8
		17450	5.9
3/8/65	1414	12650	7.3
3/9/65	0100	13475	6.3
		15075	6.2
		15475	6.3
		15500	6.6
3/9/65	1006	12625	5.7
		13825	6.0
	1341	1100	7.3
3/10/65	1201	12975	5.0
3/13/65	0122	12950	6.8
3/16/65	0100	12475	5.0
3/25/65	1300	16925	8.1
		16975	7.4
4/9/65	0000	5150	5.3
		16300	7.0
		16350	6.9
4/13/65	1415	12925	5.1
		13450	6.4
	1806	13175	6.2
6/3/65	1140	16325	5.2

data showed several instances of abrupt change of direction and/or speed for one or two layers, then a return to previous values.

It is not possible to state categorically that such observations could not exist, even if they appear unusual and may have been caused by instrumental characteristics such as radar searching for its target. On the recommendation of J. Scoggins, NASA, Huntsville, all data were retained as each value is smoothed over about 80 points in each 50 meter layer.

F. Comparison of shear magnitude with direction change

In Appendix A a frequency distribution will be found, giving by 2 km layers, a bivariate distribution of magnitude against direction change for each of the five parameters treated in this report. Means, deviations, absolute and relative frequency are also included. The unequal class intervals should be noted when interpreting distributions. This was done to provide greater resolution of the most frequent categories. Fig. 25 presents the frequency distribution of $(JS)_1$ for each 2 km layer from this tabulation. It shows essentially the same features as already discussed above for Figs. 19 and 20. For extreme direction changes, ($\geq$ 10°/25m), maximum frequency (2.8%) occurs at the surface layer. This frequency decreases to 0 at the tropopause and then increases upward.

G. Short period time variations

Among the 175 ascents, there were 59 pairs of observations which were taken within four hours of each other. The average time interval is

about one hour but varies from 15 minutes to 4 hours. All five parameters were computed as was done for the entire data set and the results are tabulated in Appendix B. Time-height sections of the ascents were even made for each parameter to see if persistent patterns could be found. All changes used in the tabulations were taken without regard to sign. In addition, the time variations of the original Jimsphere winds and of their vertical shears were graphed.

The dominant feature of the wind profiles about 10 km altitude is high persistence in time. For example, on February 10, 1965, at 12-16 km altitude, a small scale perturbation existed which could be followed throughout the series of profiles. Meanwhile, large wind shears of 1 m/sec/25m layer occurred at 15-16 km, and persisted for more than 6 hours. This feature of persistence can be important in prediction of wind shears.

Fig. 26 shows the frequency distribution of the wind speed change for consolidated levels. The peak value occurs at the 1.5-2.0 m/sec interval, and wind speed changes of less than 4 m/sec occur 80% of the time. These seem to indicate that in general the wind speeds are rather persistent up to 4 hours.

As may be seen in Figs. 27 and 28, the profiles of mean and standard deviation of wind speed change ΔJ_s depend on altitude. In the friction layer, the mean curve tends to decrease with altitude. The minimum mean values occur in the mid-troposphere between 2 to 6 km. The largest values occur at 10 to 13 km at the subtropical jet stream level, and above 13 km in the lower stratosphere the speed change decreases. The standard deviation shows similar features.

The frequency distribution of the magnitude of wind shear change $\Delta (JS)_s$ in Fig. 29, also shows the same shape as the wind speed changes ΔJ_s. Its peak frequency occurs at .250 to .375 m/sec/25m. Large shear changes of greater than 1.0 m/sec/25m are infrequent, occurring in less than 15 percent of the observations. Such large shear changes are usually found above 10 km altitude. The mean values of wind shear change are shown in Fig. 30. Those above 10 km altitudes are much larger than at lower altitudes. The standard deviation of the wind shear change represented in Fig. 31 shows similar features.

Acknowledgement

The authors wish to thank the Aero-Astrodynamics Laboratory for the use of the Jimsphere data and J. P. Scoggins for helpful discussions of data reliability.

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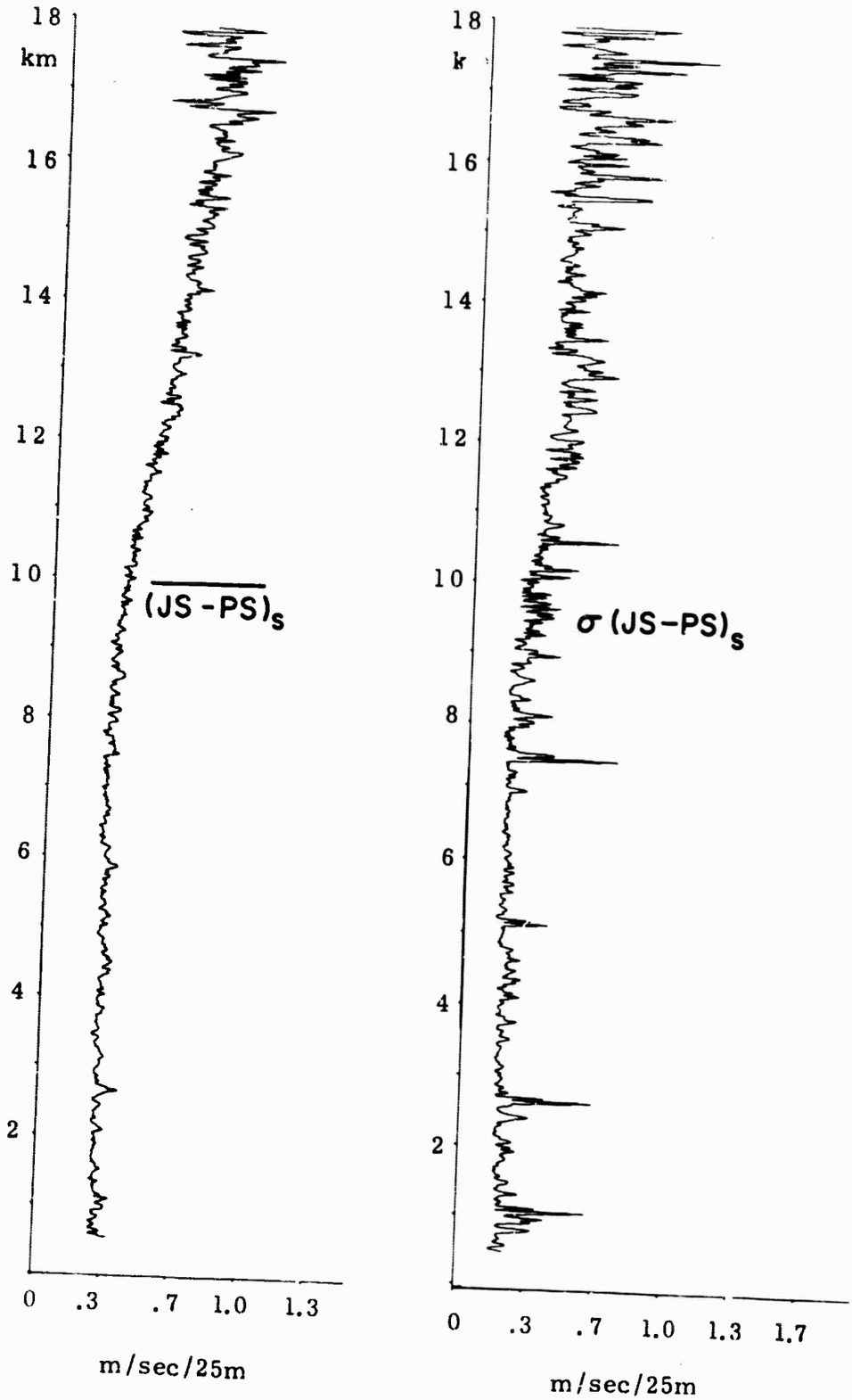
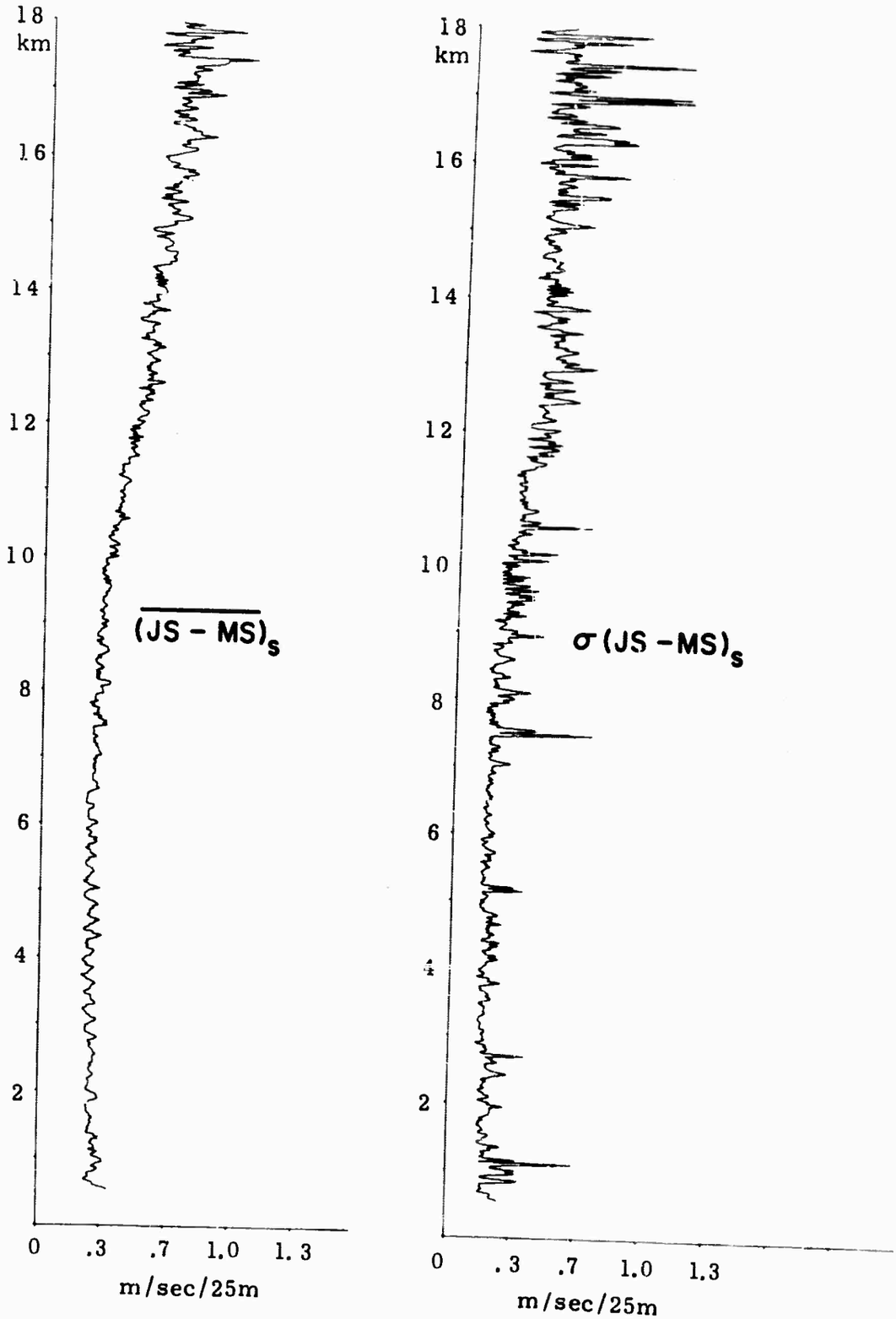


Figs. 1 and 2. Mean difference of Jimsphere shear from pressure shear, and its standard deviation.



Figs. 3 and 4. Mean difference of Jimsphere shear from minute shear, and its standard deviation.

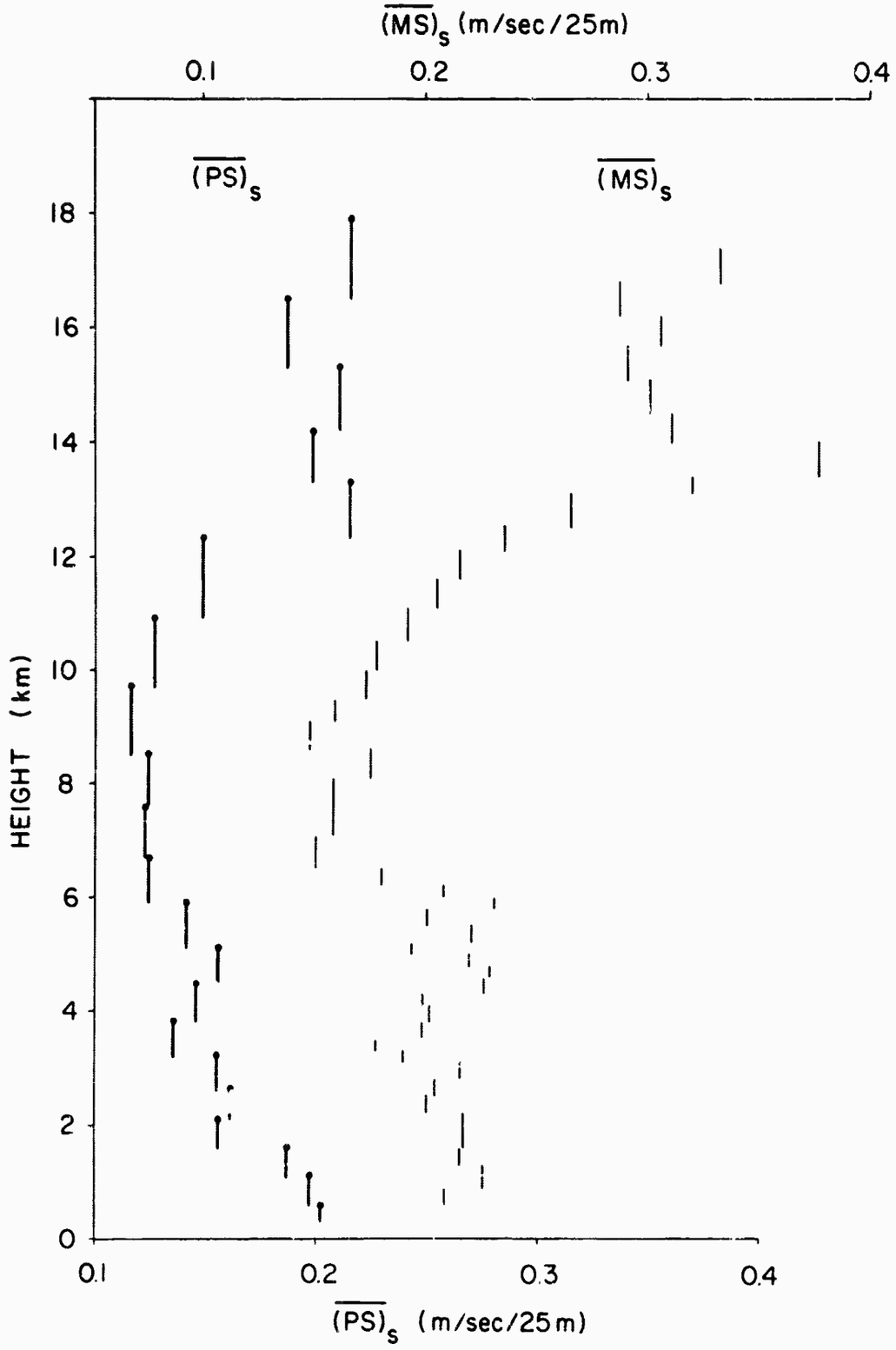


Fig. 5. Mean pressure and minute shears.

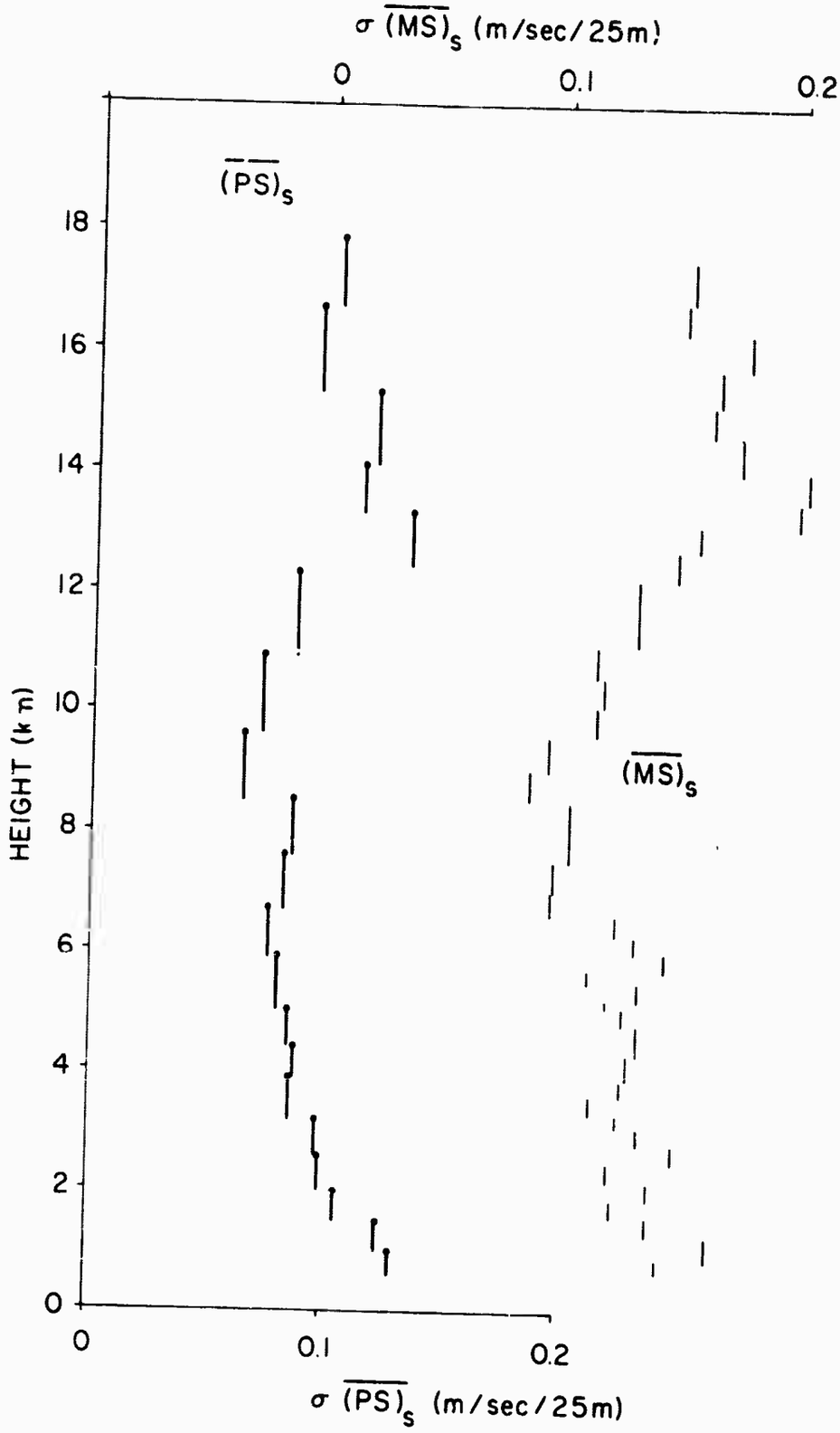
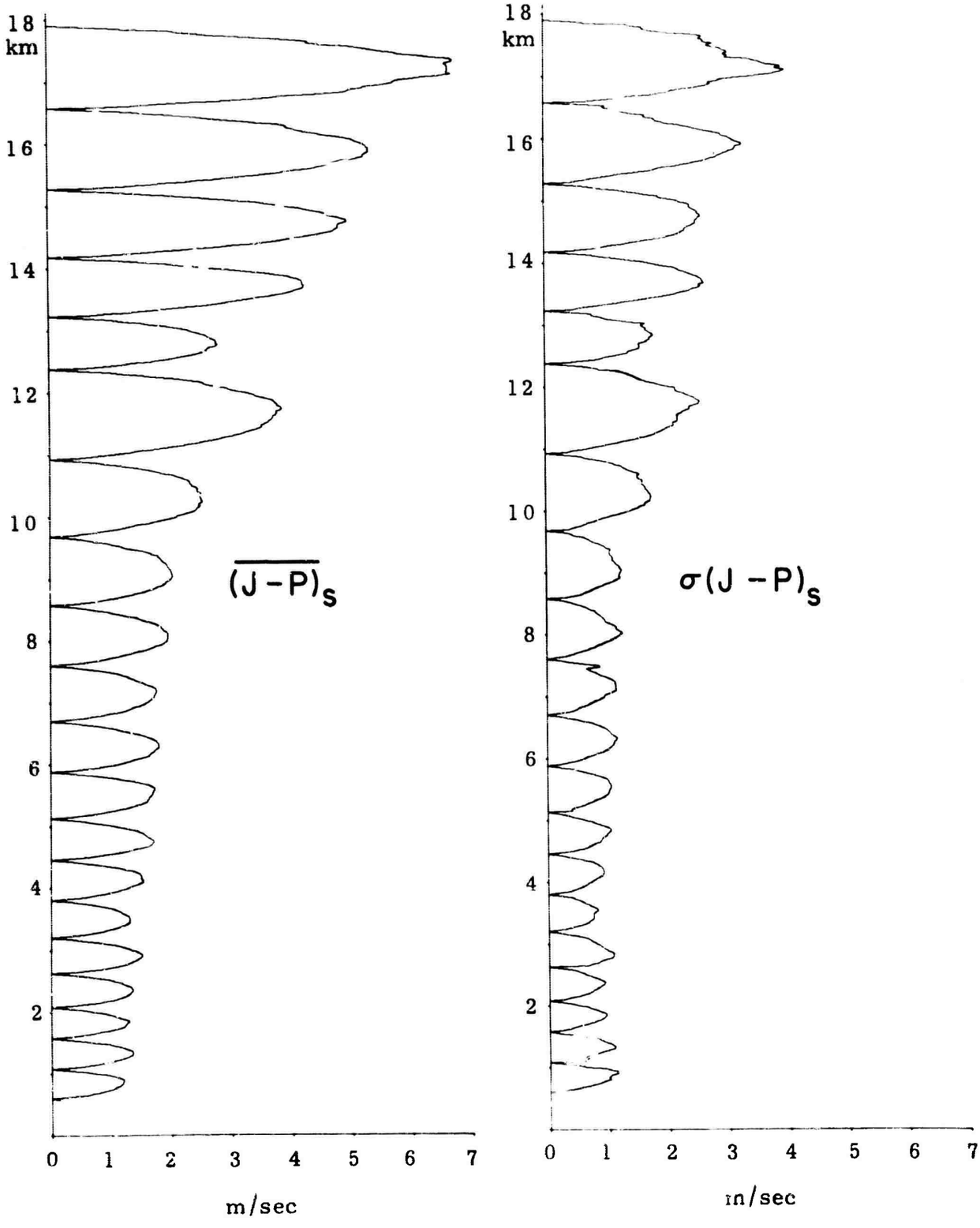
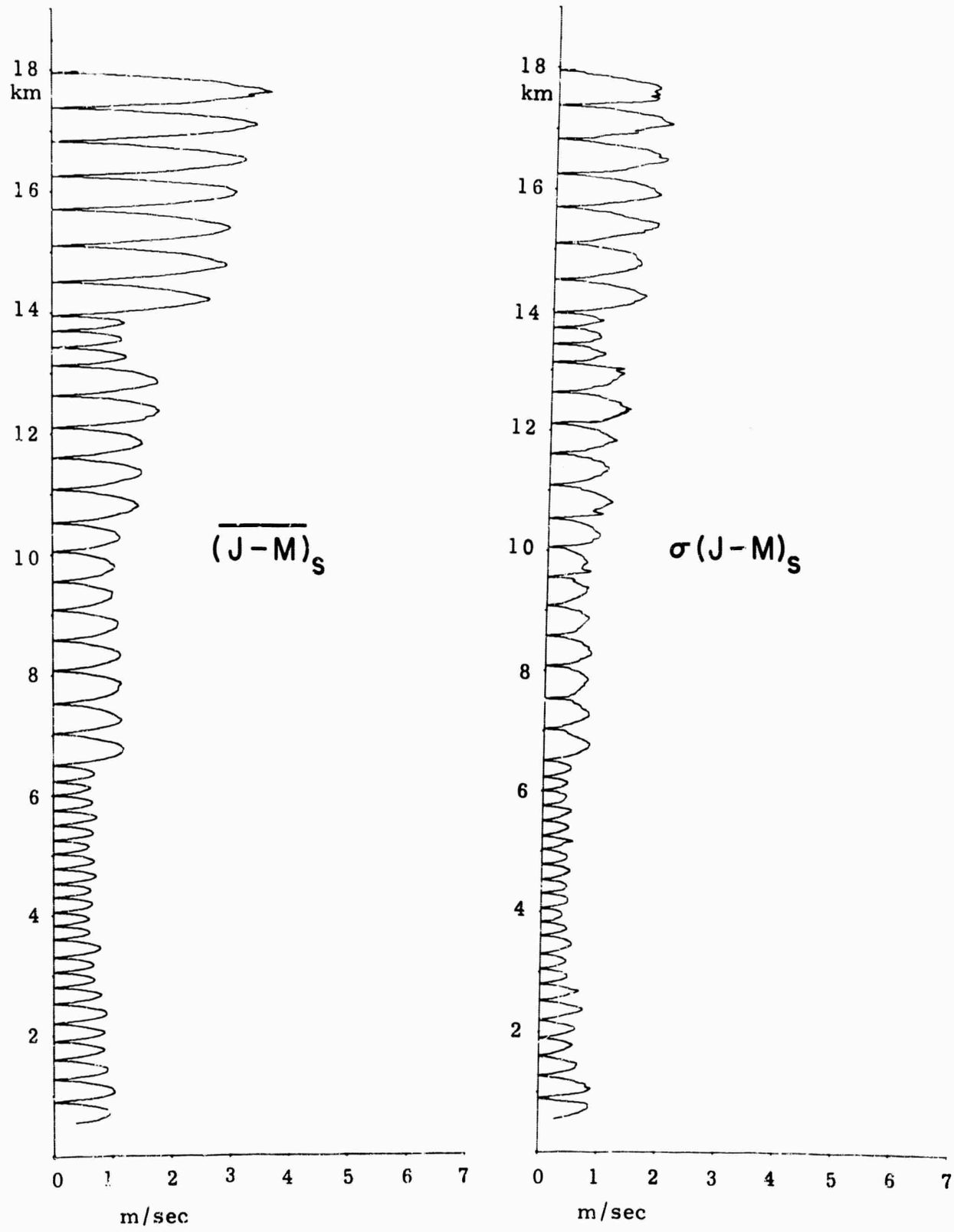


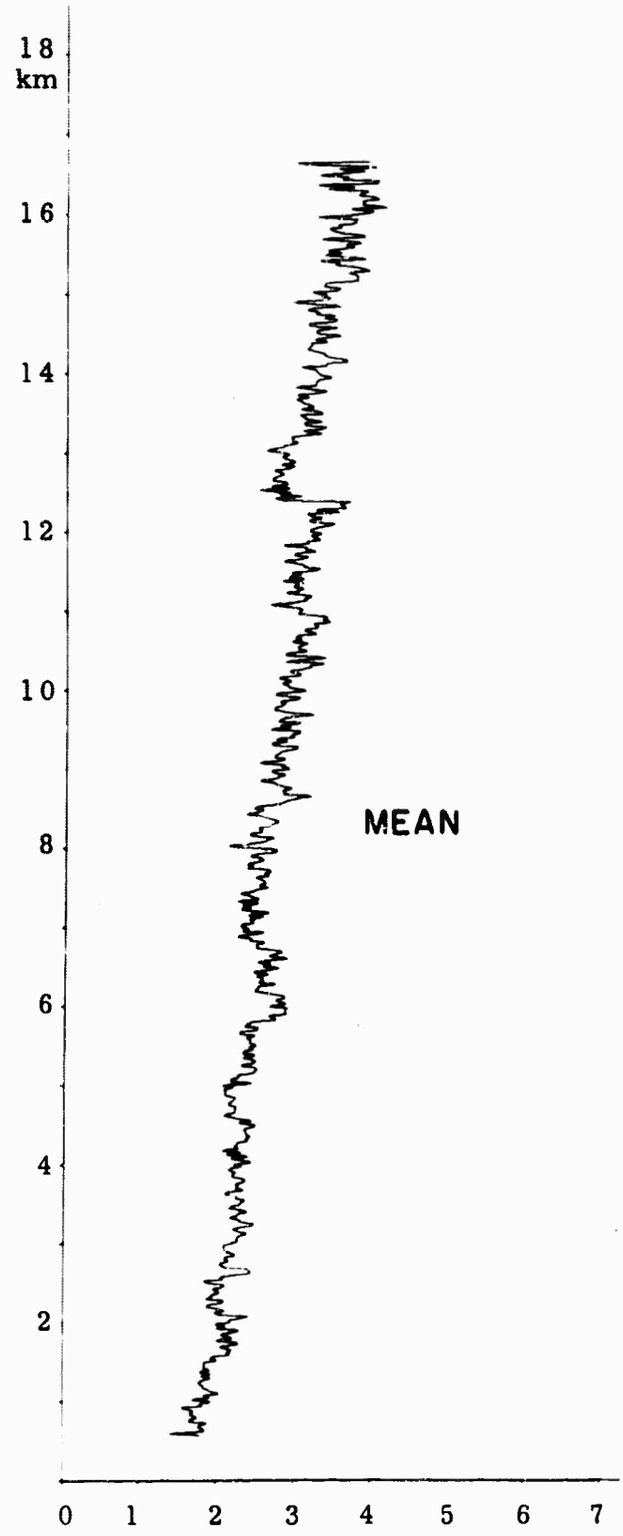
Fig. 6. Standard deviations of pressure and minute shears.

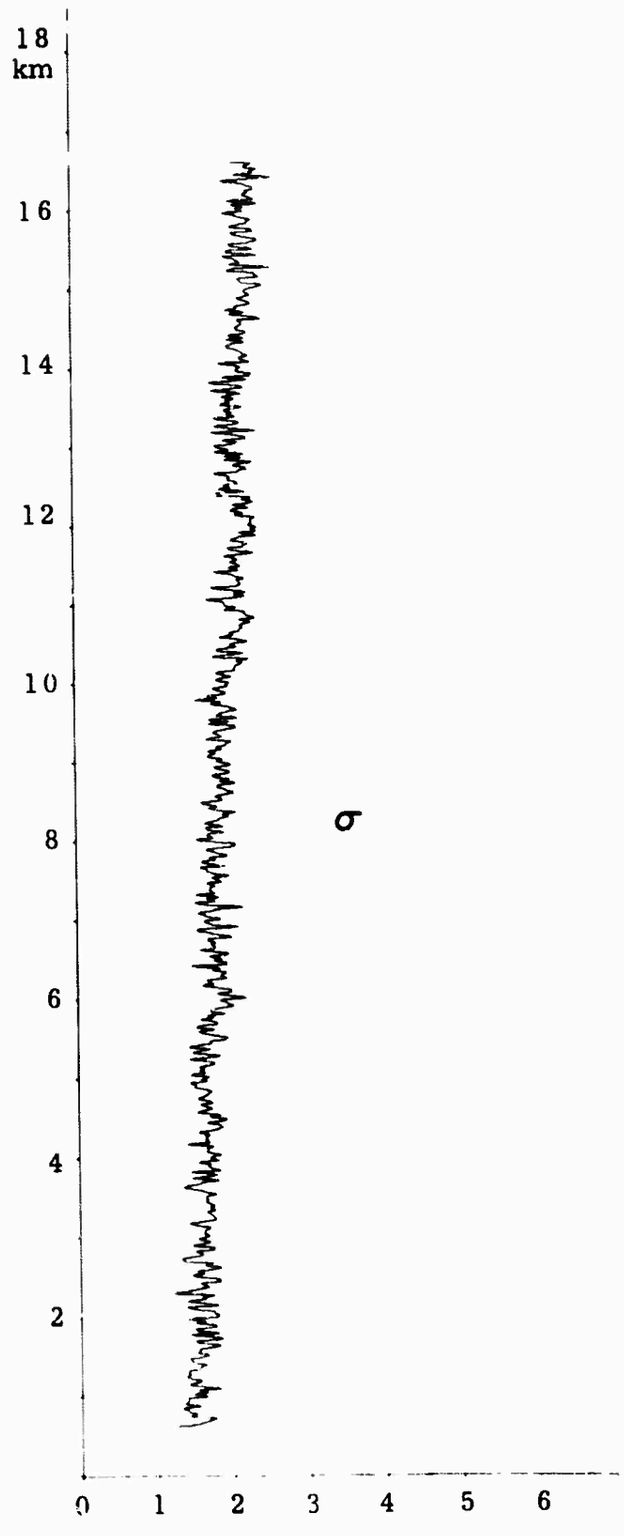


Figs. 7 and 8. Mean difference of Jimsphere and pressure wind and its standard deviation.

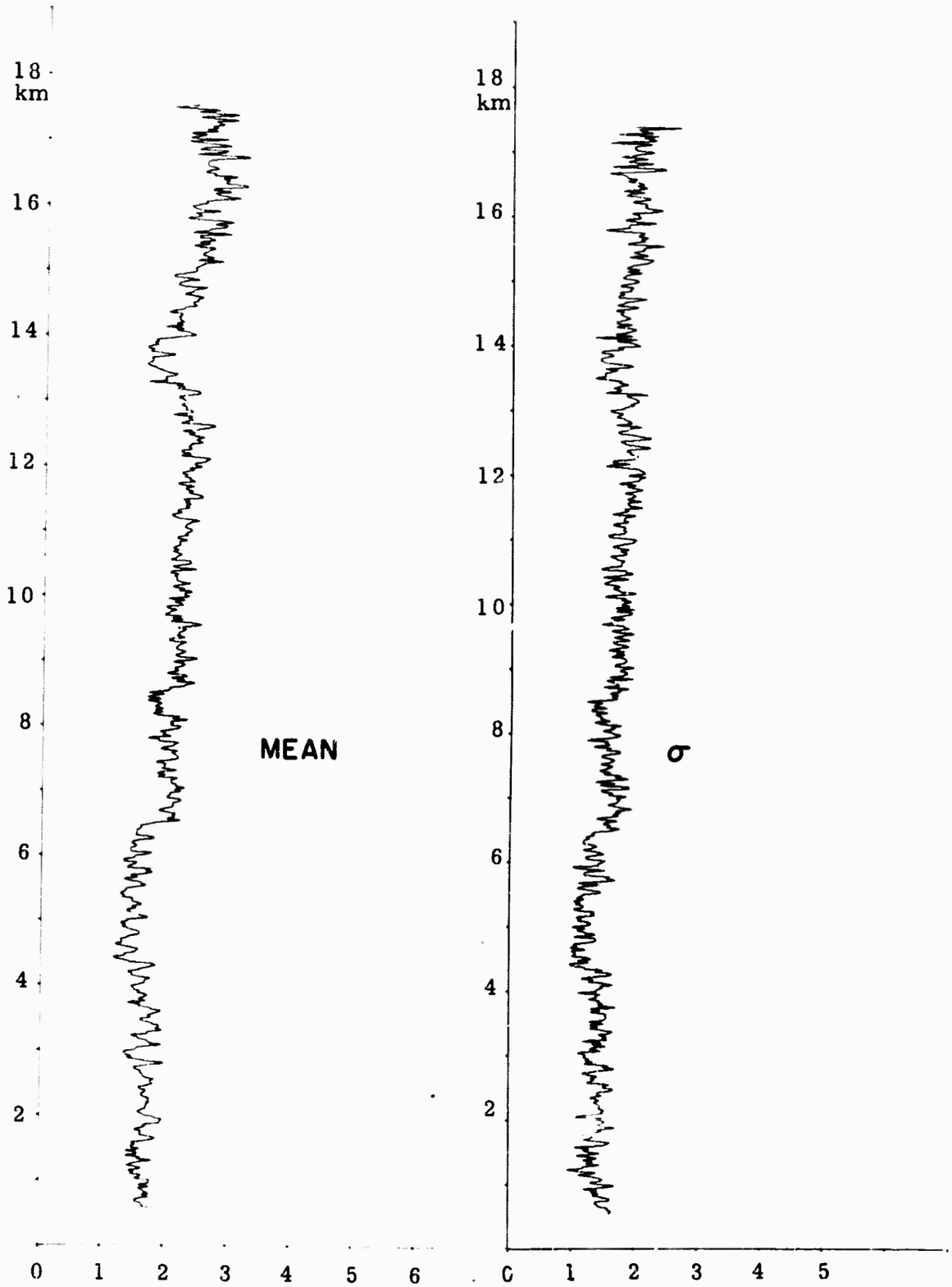


Figs. 9 and 10. Mean difference of Jimsphere and minute wind and its standard deviation.





Figs. 11 and 12. Mean relative error of Jimsphere and pressure shear, and its standard deviation.



Figs. 13 and 14. Mean relative error of Jimsphere and minute shear and its standard deviation

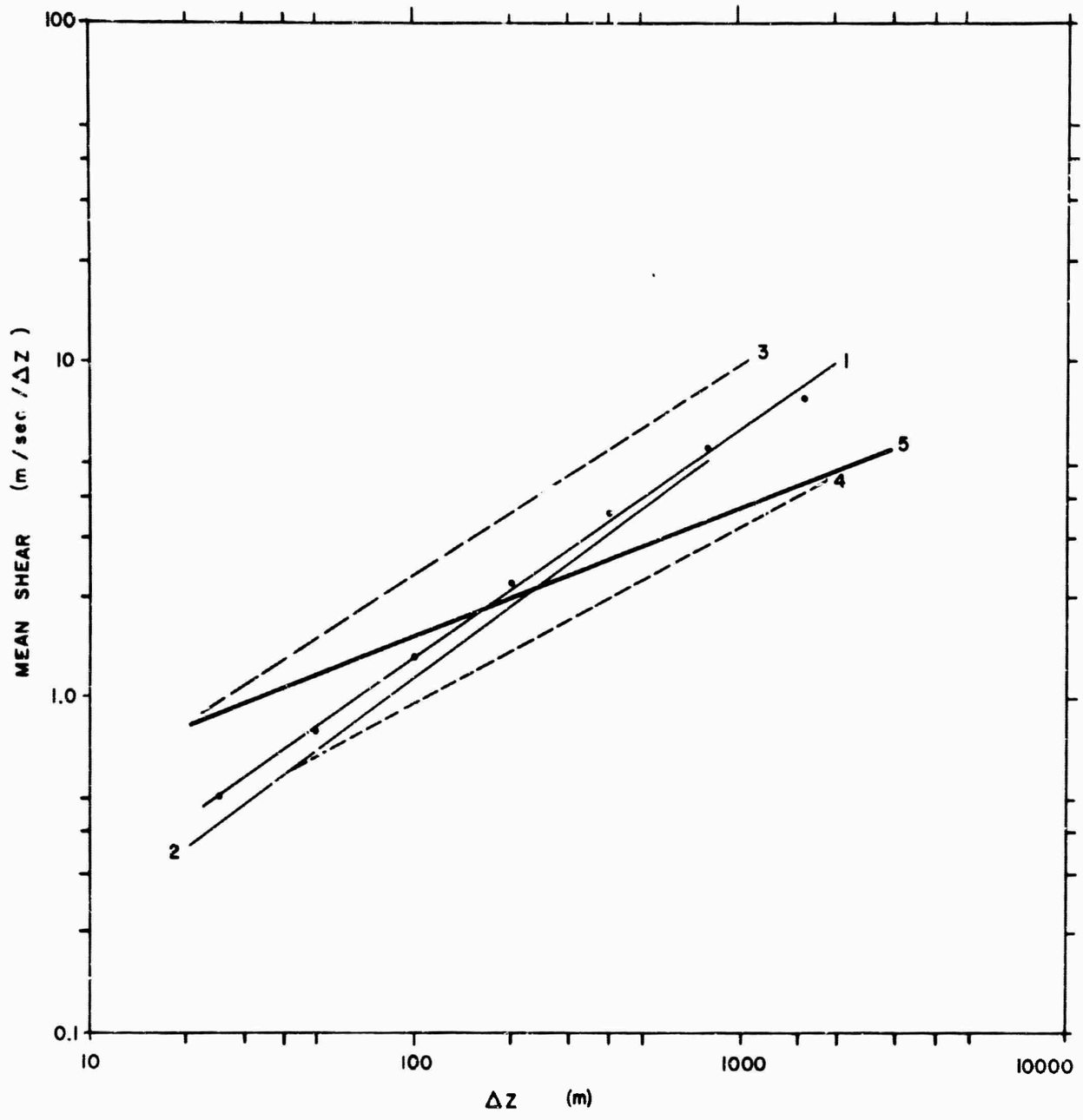


Fig. 15. Comparison of mean shear regressions for various data

Curve 1	Jimsphere	Nov. - June	0 - 18 km	Cape Kennedy	
Curve 2	Jimsphere	Jan. - Feb.	0 - 3 km	" "	(Ref. 1)
Curve 3	Rocket	February	0 - 25 km	" "	(Ref. 4)
Curve 4	Rocket	July	0 - 25 km	" "	(Ref. 4)
Curve 5	Camera	Aug. - Sept.	0 - 3 km	White Sands	(Ref. 2)

Curve 1 Mean shear = $.058\ (\Delta Z)^{.68}$

Curve 3 Mean shear = $.131\ (\Delta Z)^{.62}$

Curve 4 Mean shear = $.086\ (\Delta Z)^{.53}$

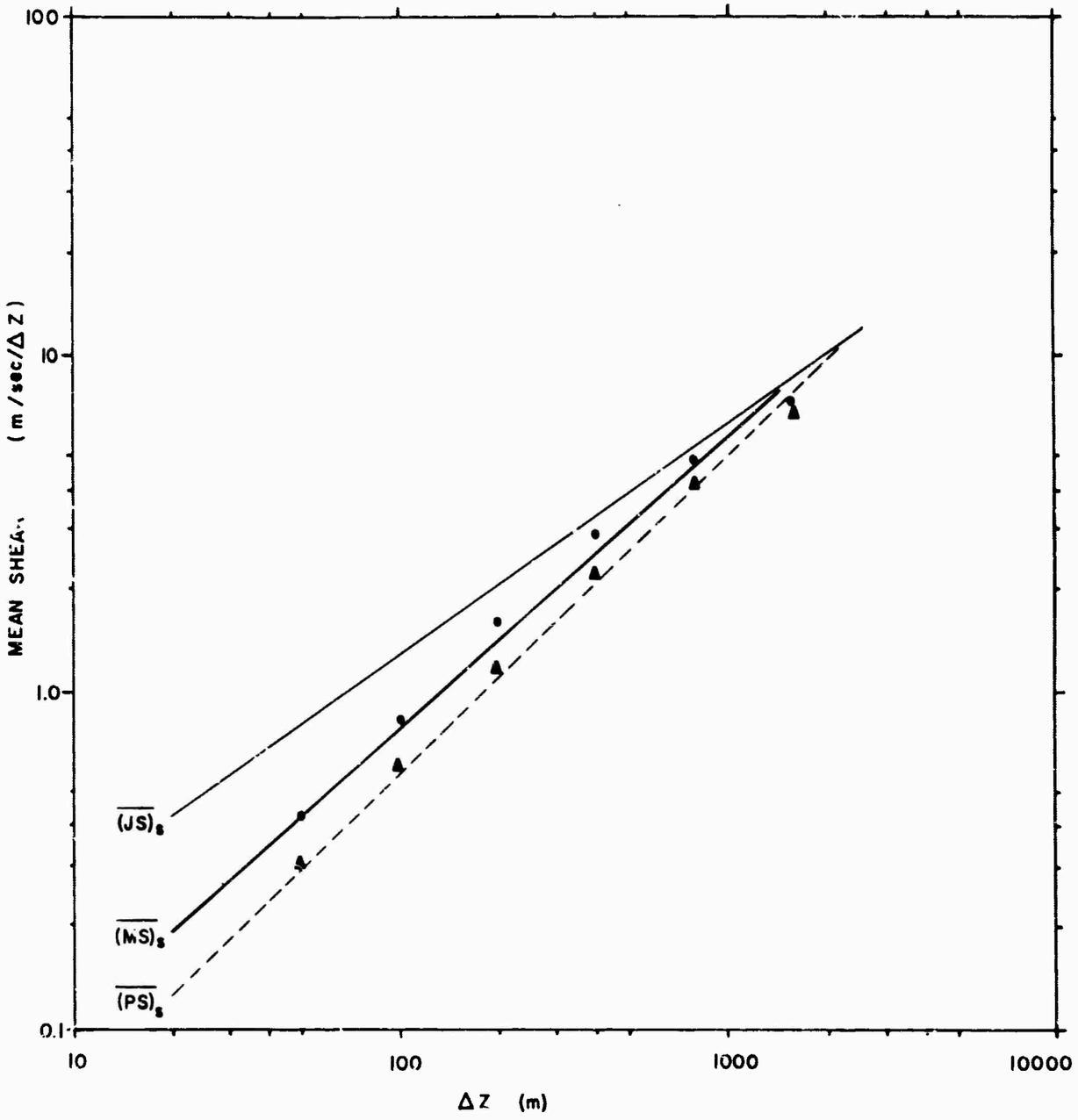


Fig. 16 Comparison of Jimsphere shear, pressure shear and minute shear to layer thickness

$$\overline{(JS)}_s = 0.058 \quad (\Delta Z)^{.68}$$

$$\overline{(MS)}_s = 0.015 \quad (\Delta Z)^{.86}$$

$$\overline{(PS)}_s = 0.0075 \quad (\Delta Z)^{.92}$$

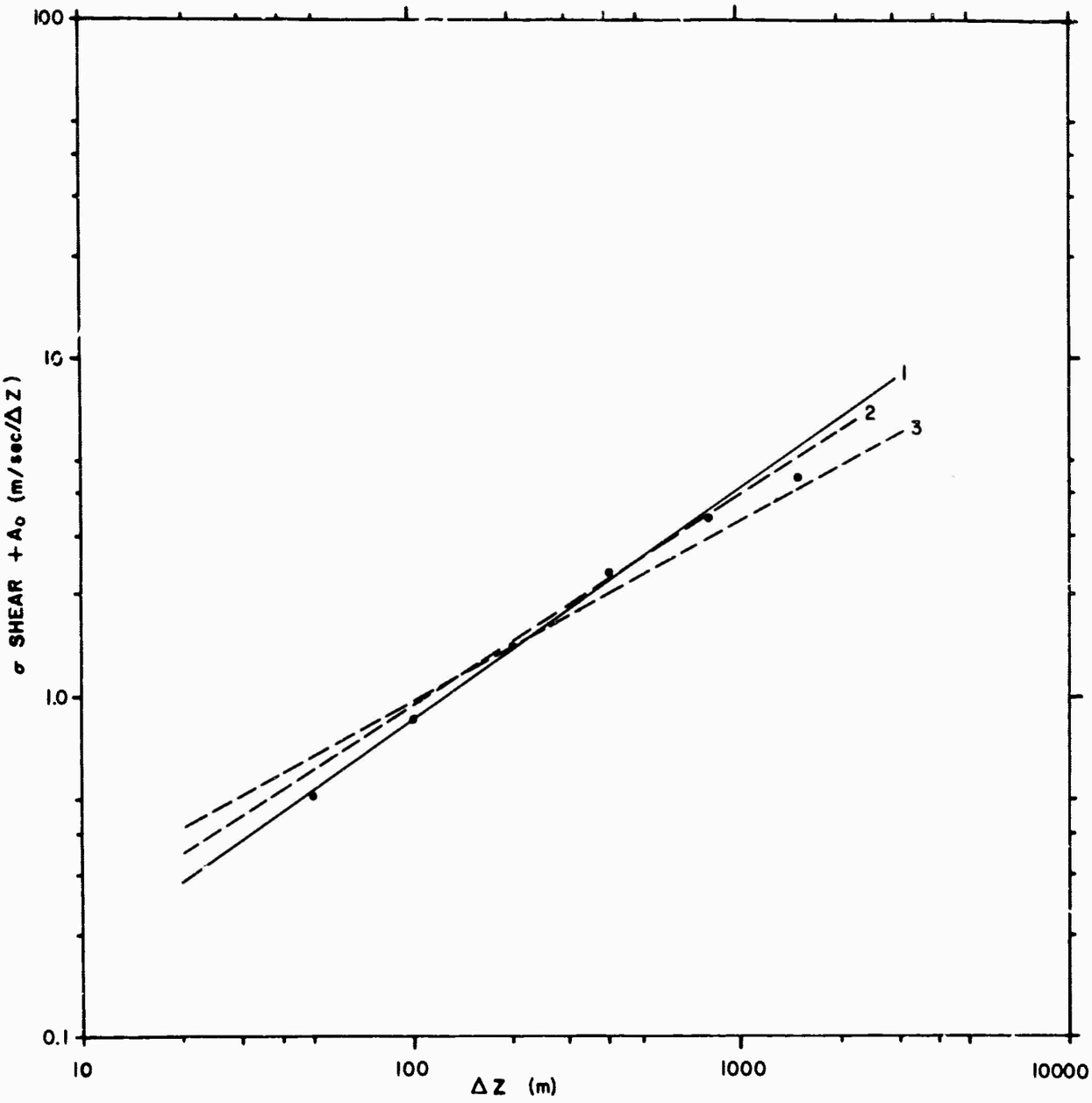


Fig. 17. Comparison of standard deviation of shear regression, with a constant

Curve 1	Jimsphere	Nov. - June	0 - 18 km	$\sigma - 0.15 = 0.038\ (\Delta Z)^{.68}$
Curve 2	Rocket	February	0 - 25 km	$\sigma + 0.529 = 0.055\ (\Delta Z)^{.62}$ (Ref. 4)
Curve 3	Rocket	July	0 - 25 km	$\sigma + 0.404 = 0.086\ (\Delta Z)^{.53}$ (Ref. 4)

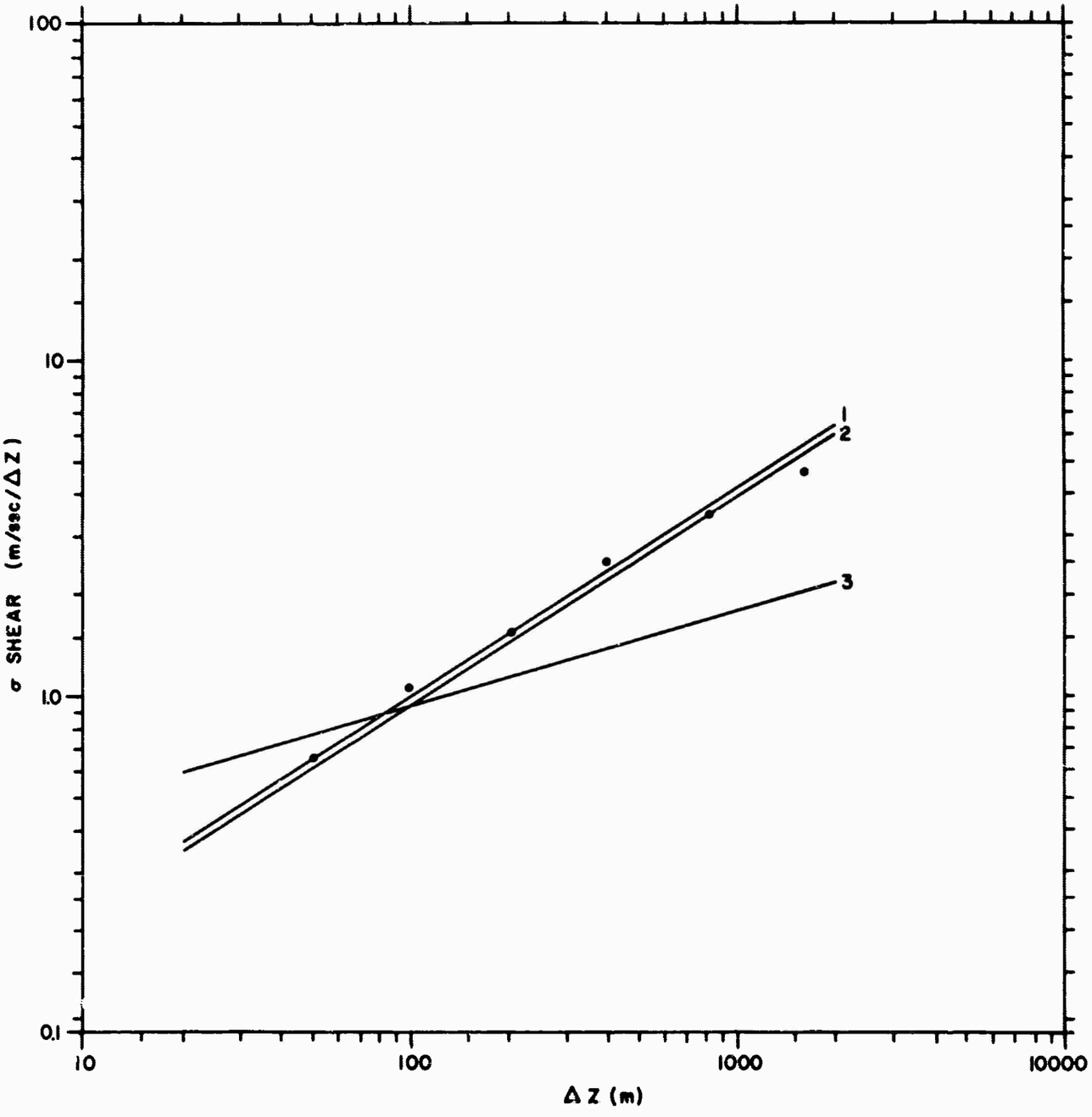


Fig. 17A. Comparison of standard deviation of shear regressions, without a constant

Curve 1 Jimsphere Nov. - June 0 - 18 km $\sigma = 0.055\ (\Delta Z)^{.68}$

Curve 2 Jimsphere Jan. - Feb. 0 - 3 km (Ref. 1)

Curve 3 Camera Aug. - Sept. 0 - 3 km (Ref. 2) (White Sands)

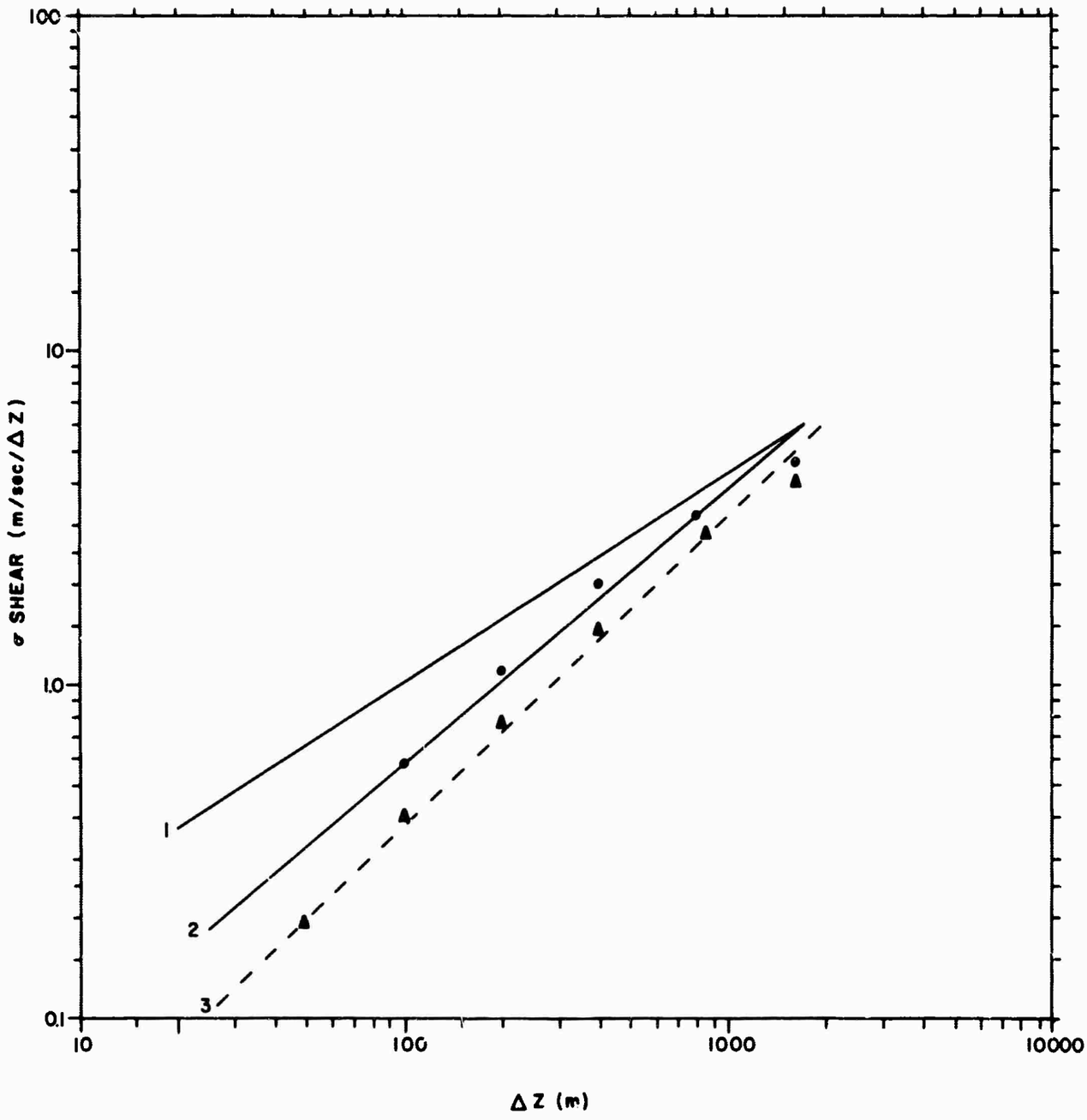


Fig. 18. Comparison of standard deviation of shear regressions for Jimsphere, pressure and minute data

Curve 1 $\sigma (JS)_s = 0.055 (\Delta Z)^{.68}$

Curve 2 $\sigma (MS)_s = 0.014 (\Delta Z)^{.86}$

Curve 3 $\sigma (PS)_s = 0.0047 (\Delta Z)^{.92}$

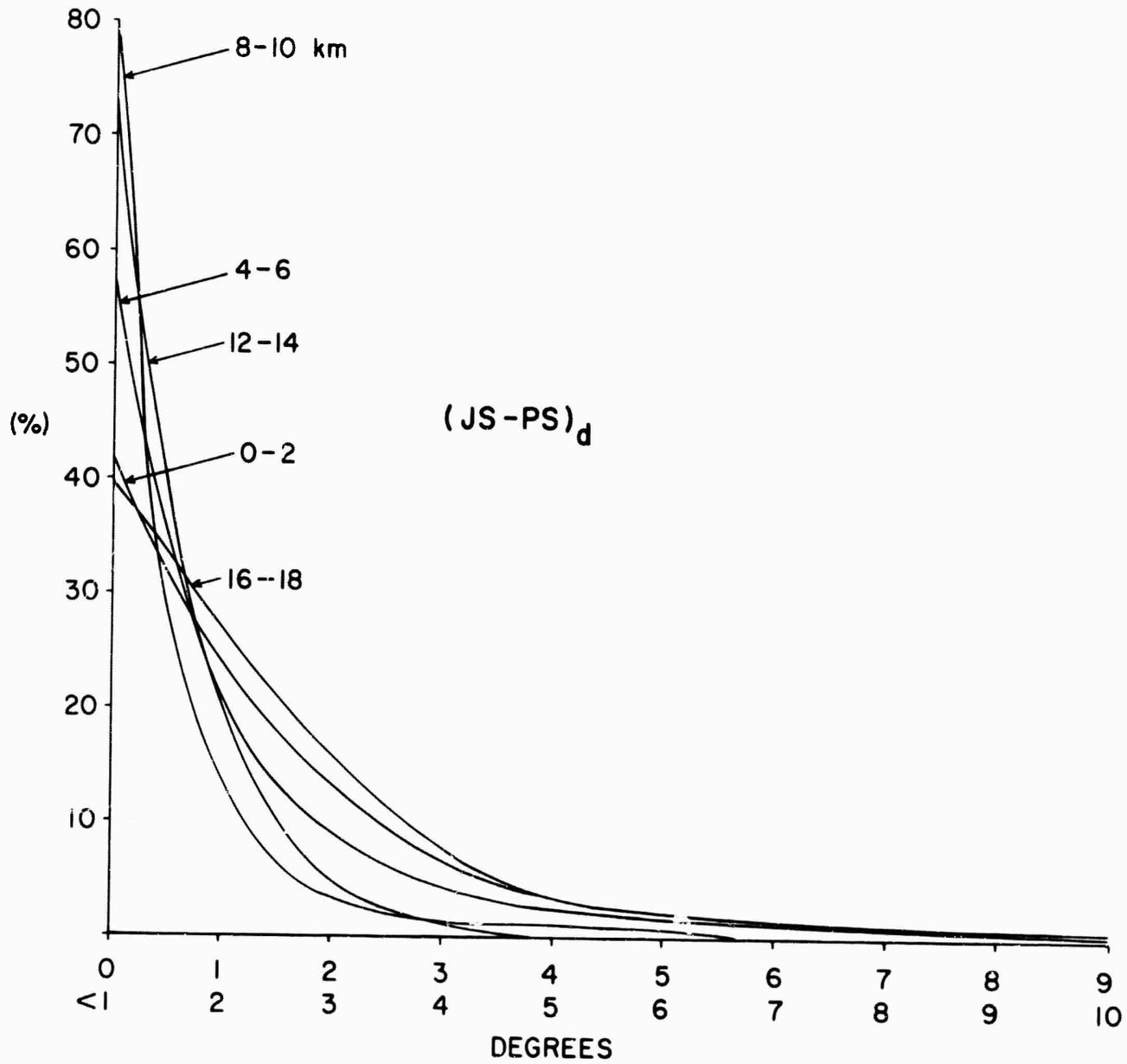


Fig. 19. Frequency distribution of differences in Jimsphere shear direction from pressure shear direction by 2 km layers.

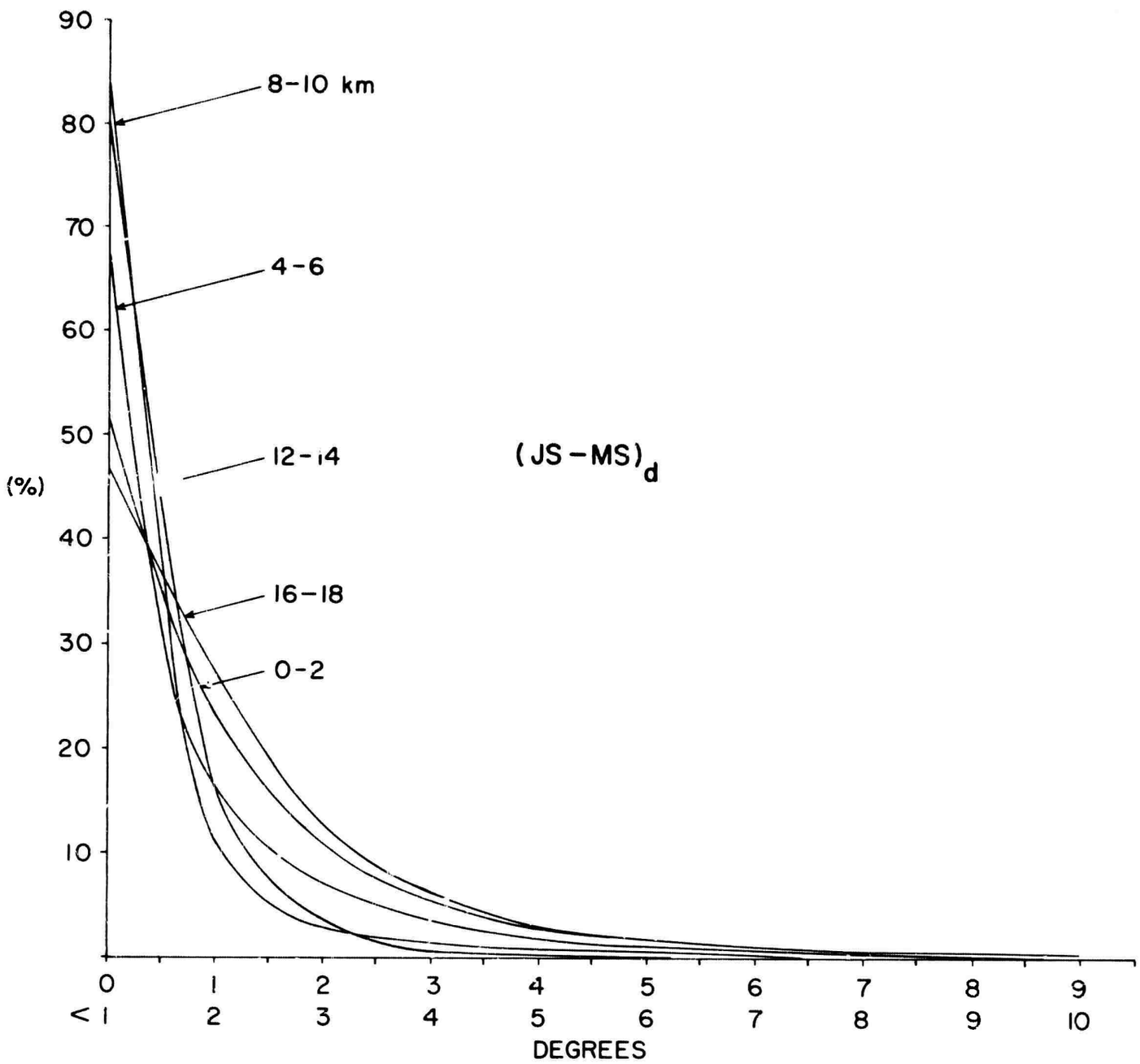
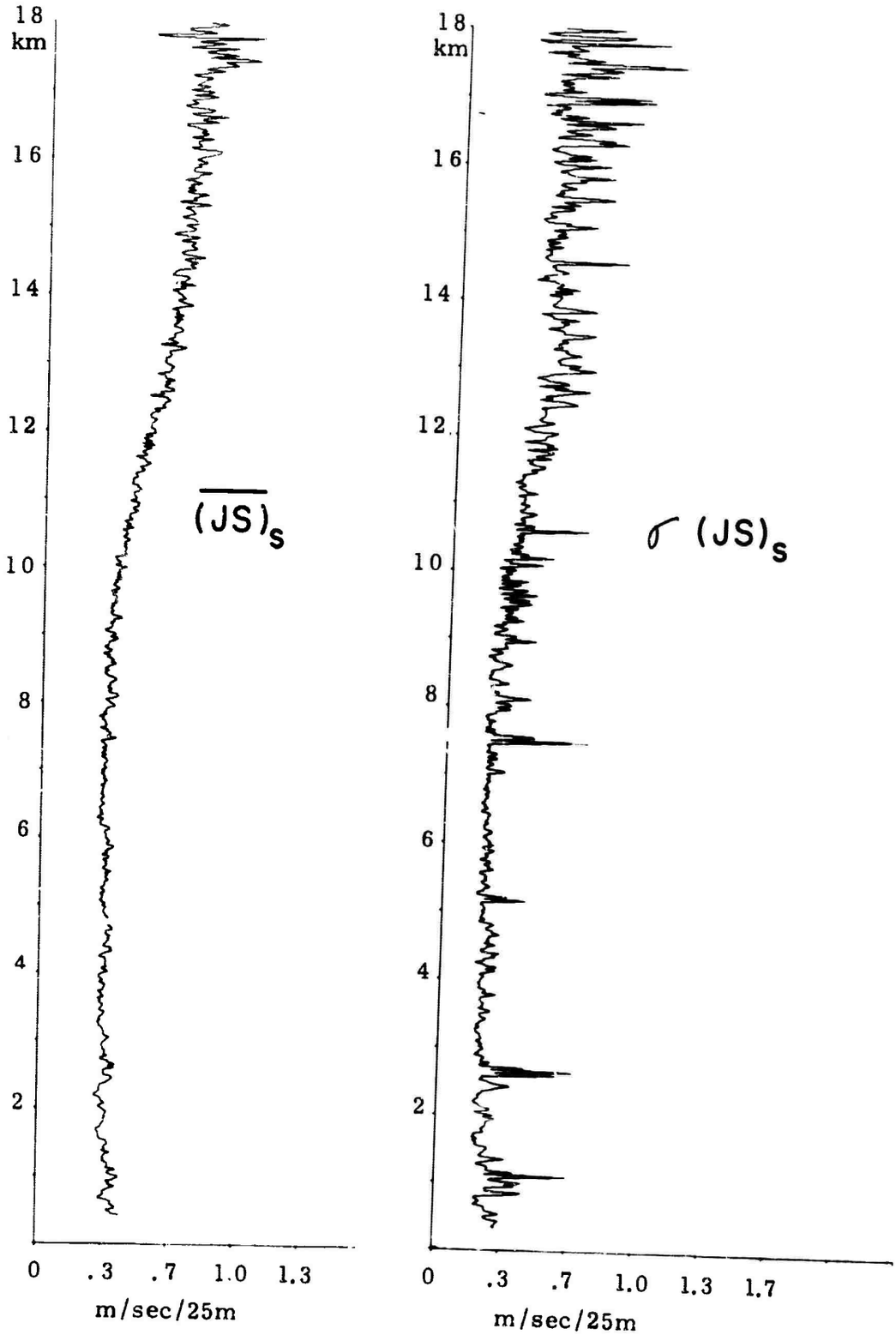


Fig. 20. Frequency distribution of differences in Jimsphere shear direction from minute shear direction by 2 km layers.



Figs. 21 and 22. Mean and standard deviation of Jimsphere shear.

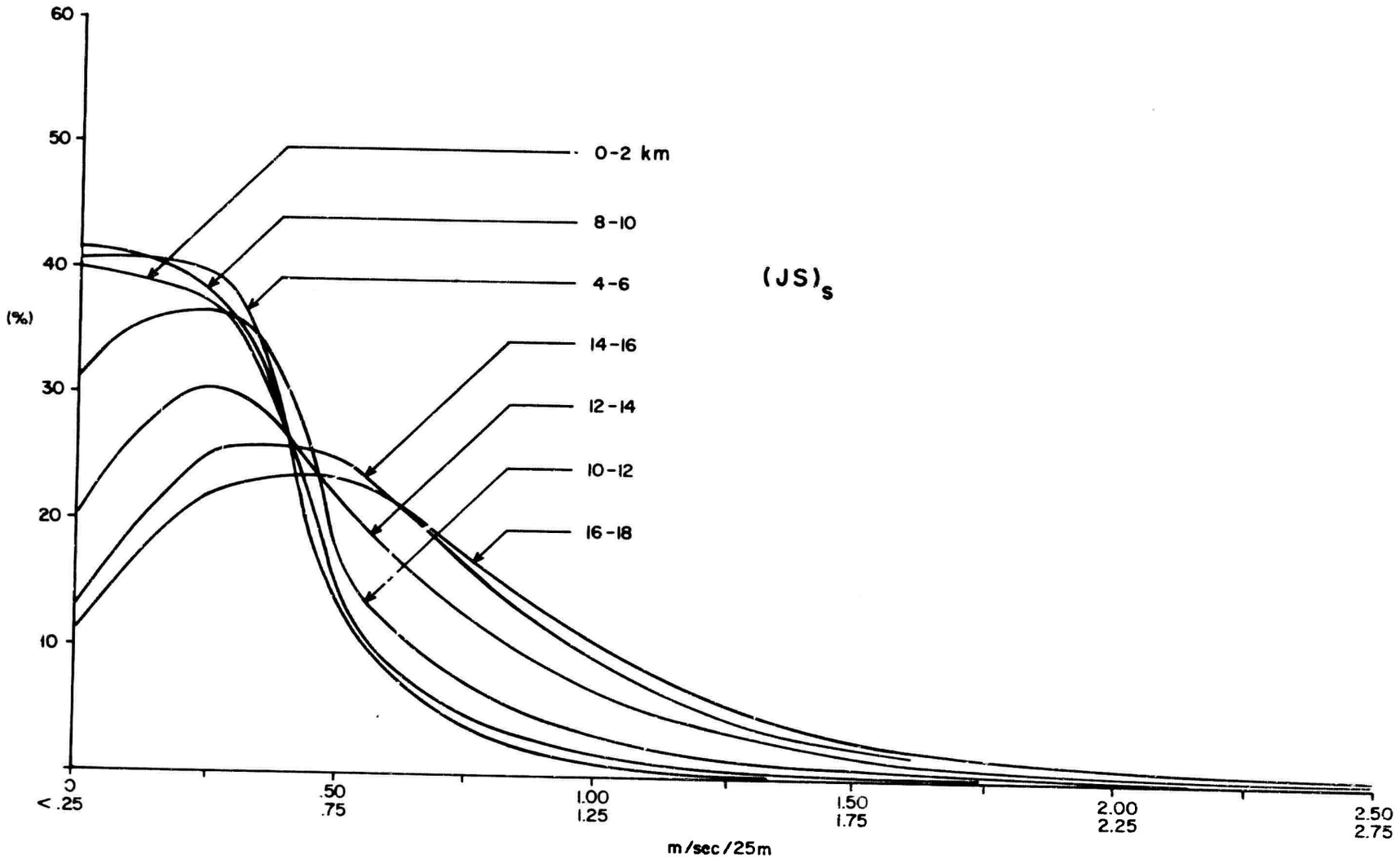


Fig. 23. Frequency distribution of Jimsphere shear by 2 km layers.

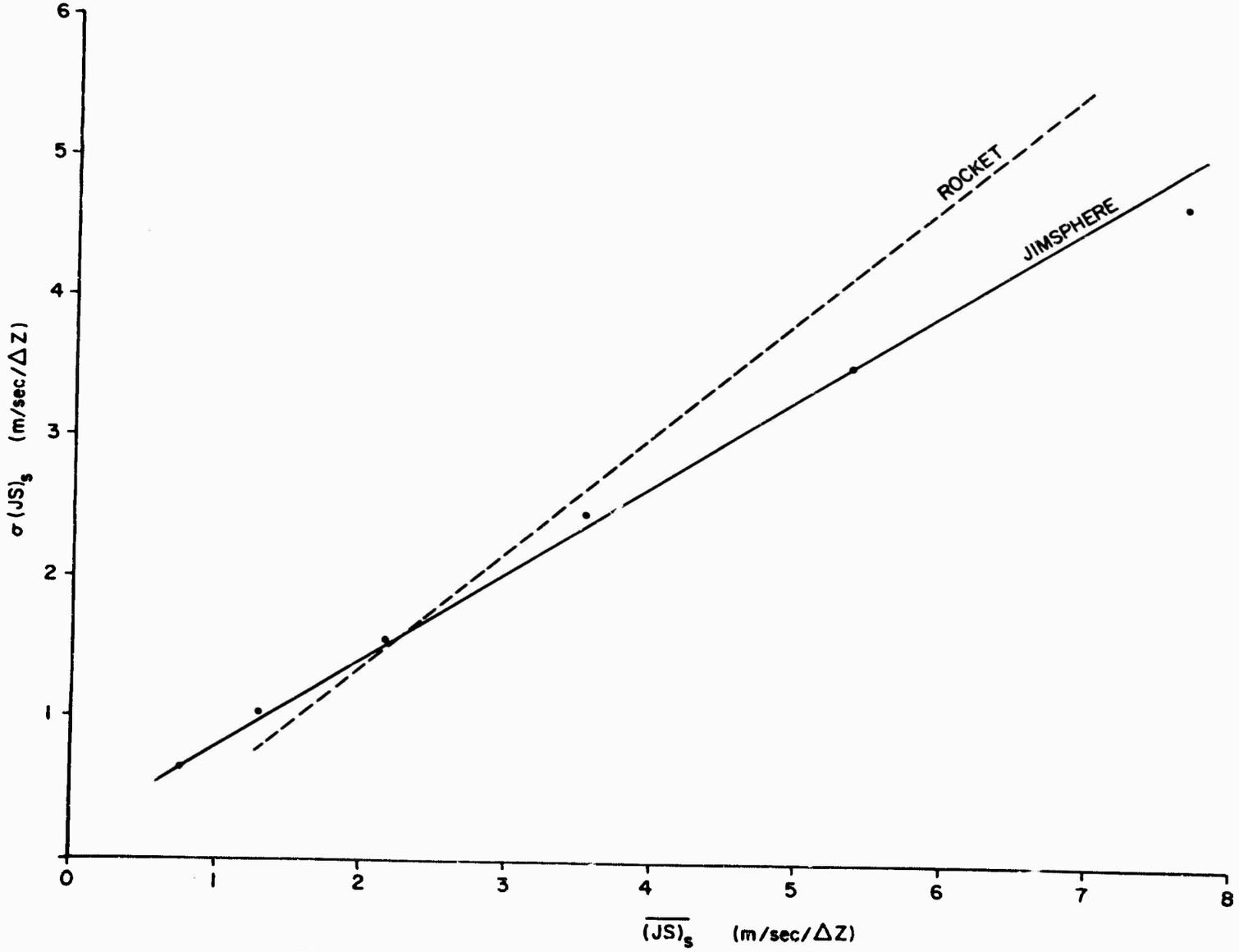


Fig. 24. Relation of mean and standard deviation of Jimsphere shear.

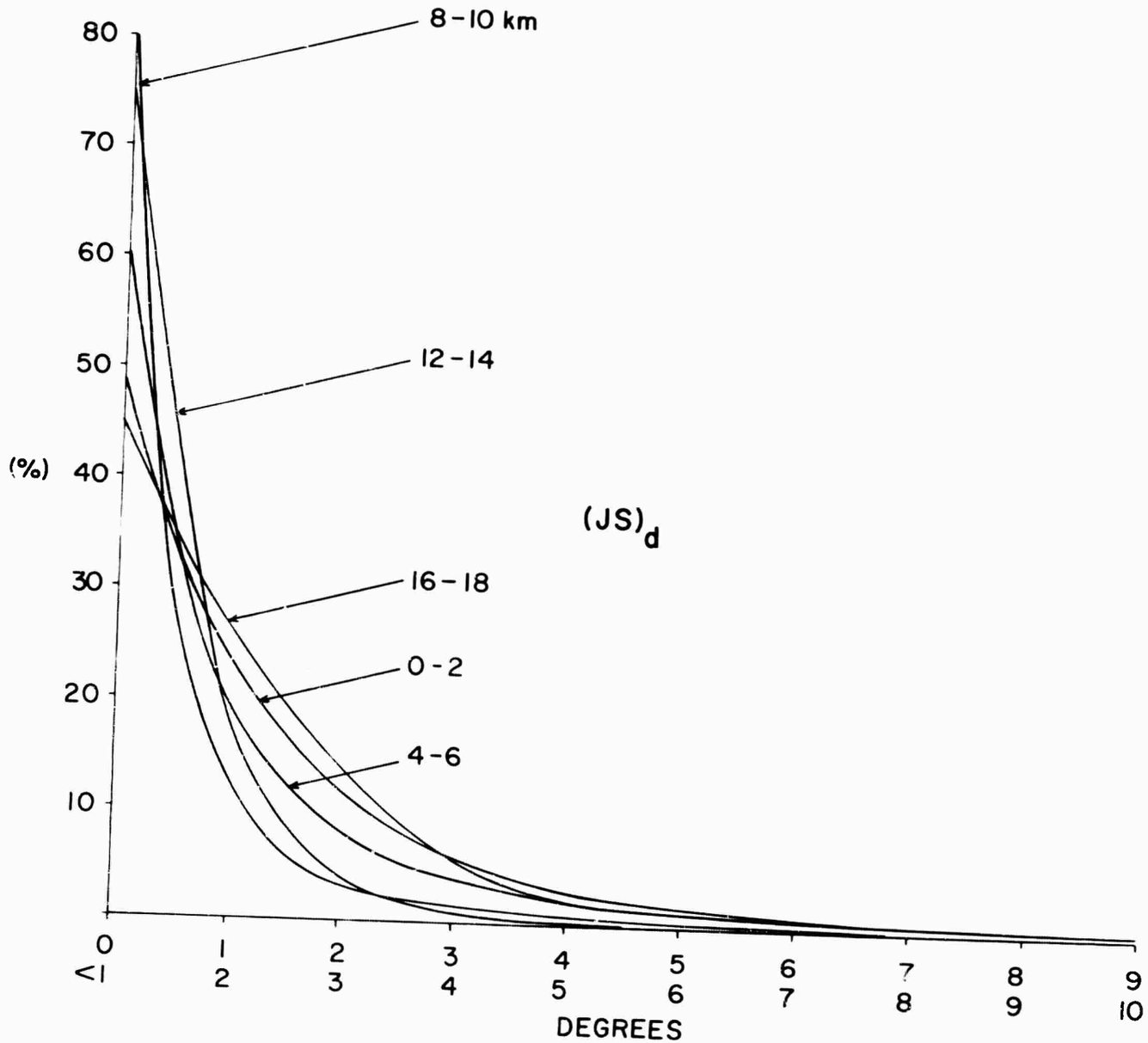


Fig. 25. Frequency distribution of Jimsphere shear direction change by 2 km layers.

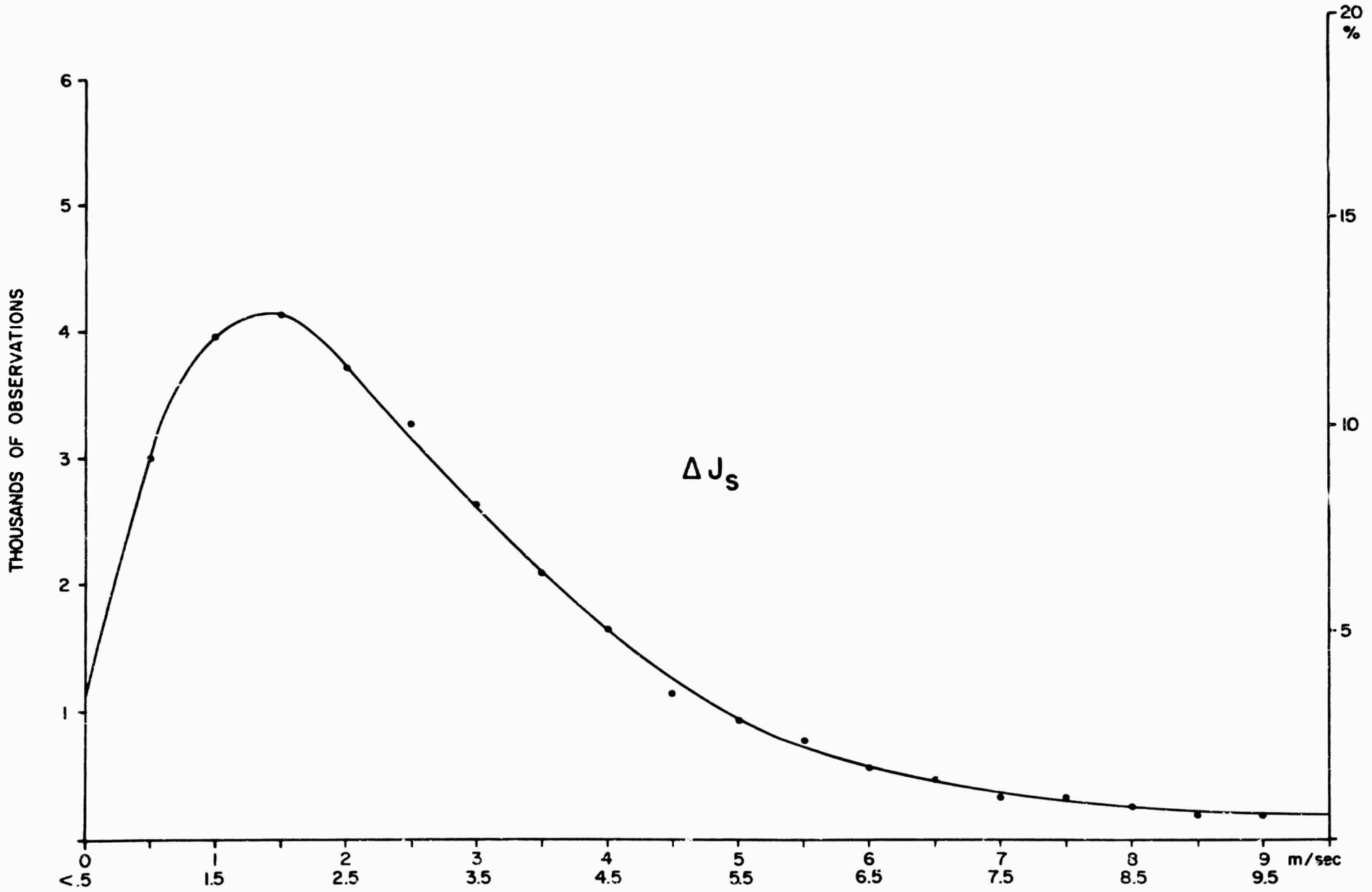


Fig. 26. Frequency distribu ion of short period changes in Jimsphere winds.

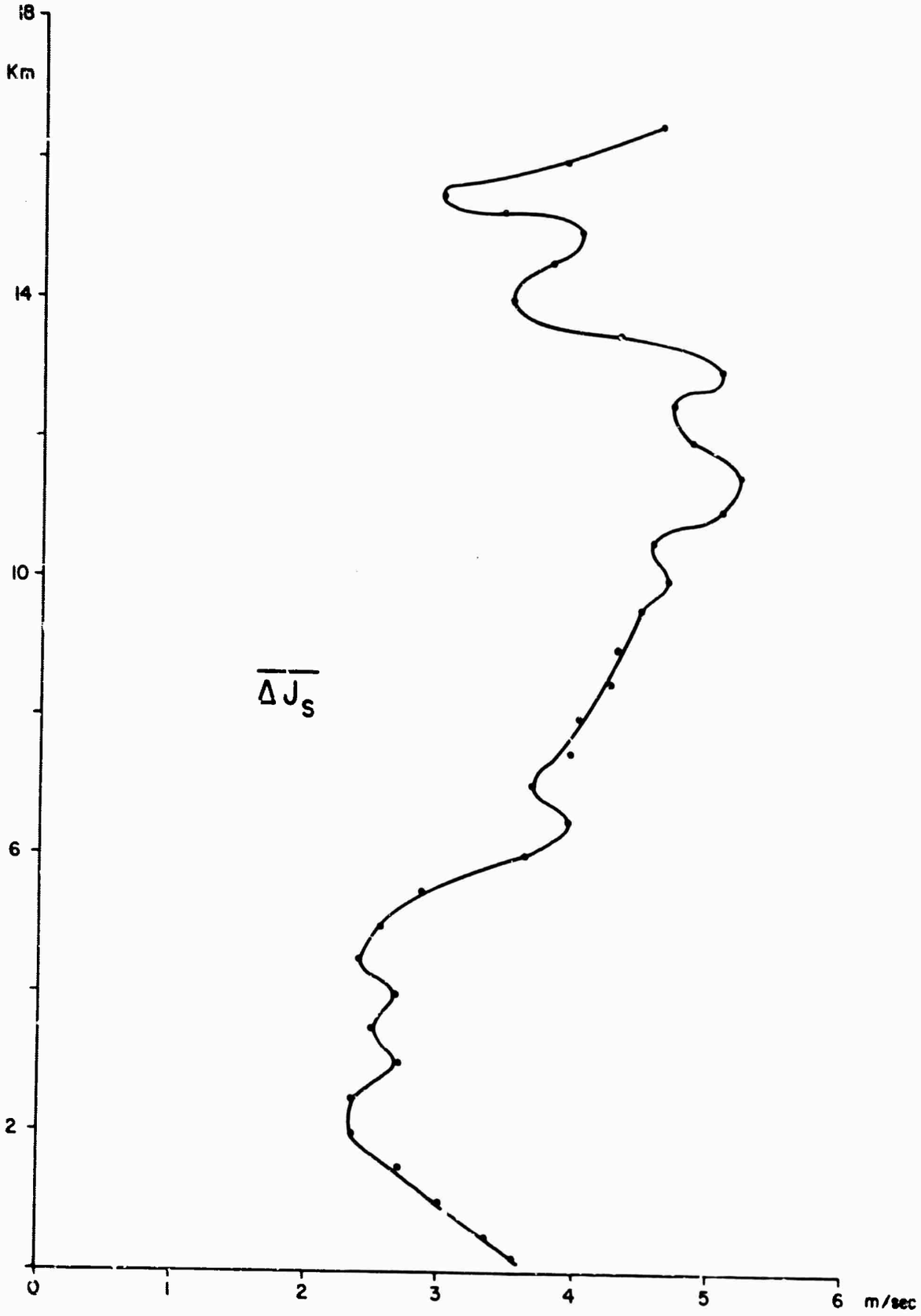


Fig. 27. Mean short period changes in Jimsphere winds.

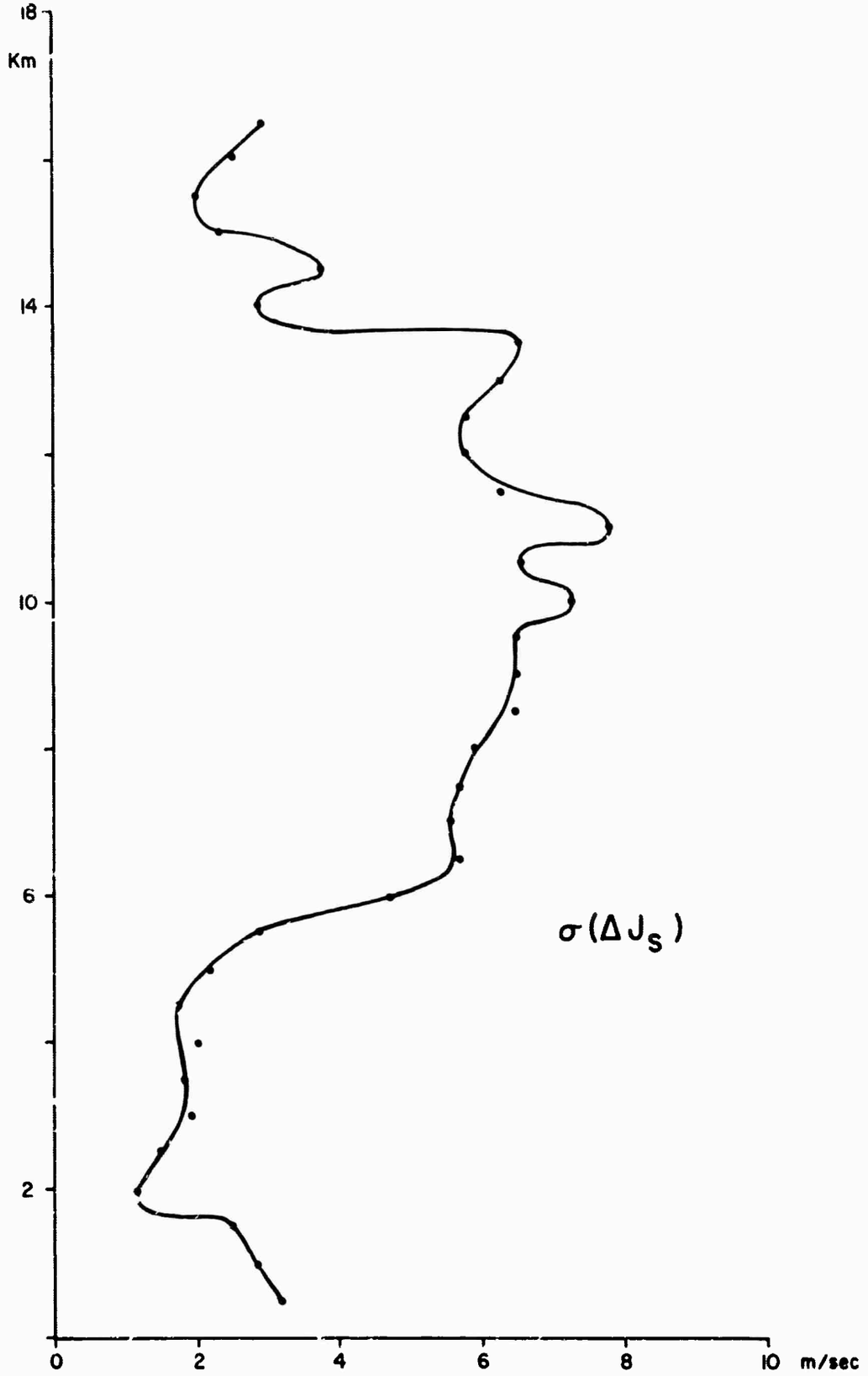


Fig. 28. Standard deviation of short period changes in Jimsphere winds.

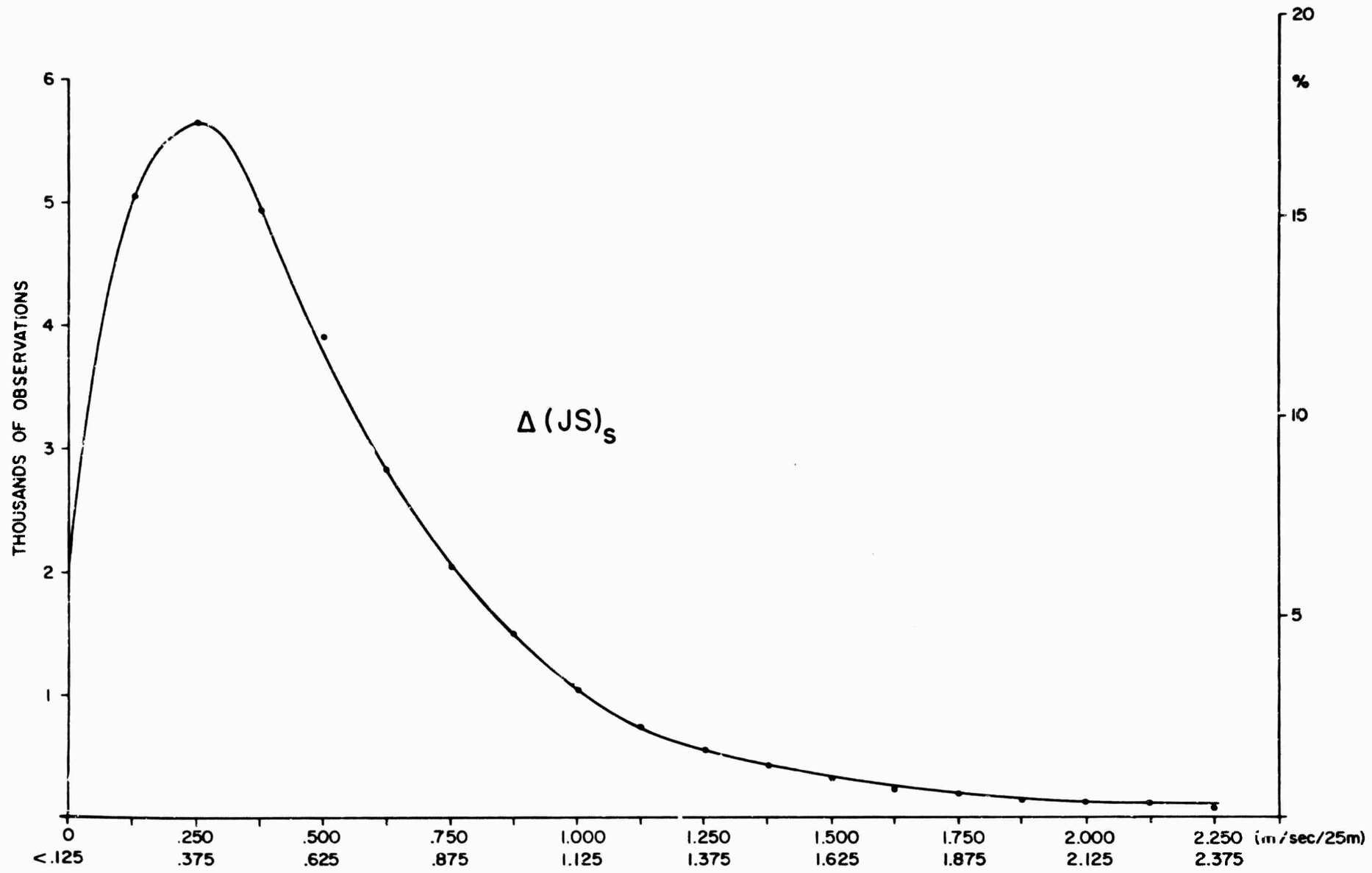


Fig. 29. Frequency distribution of short period changes in Jimsphere shear.

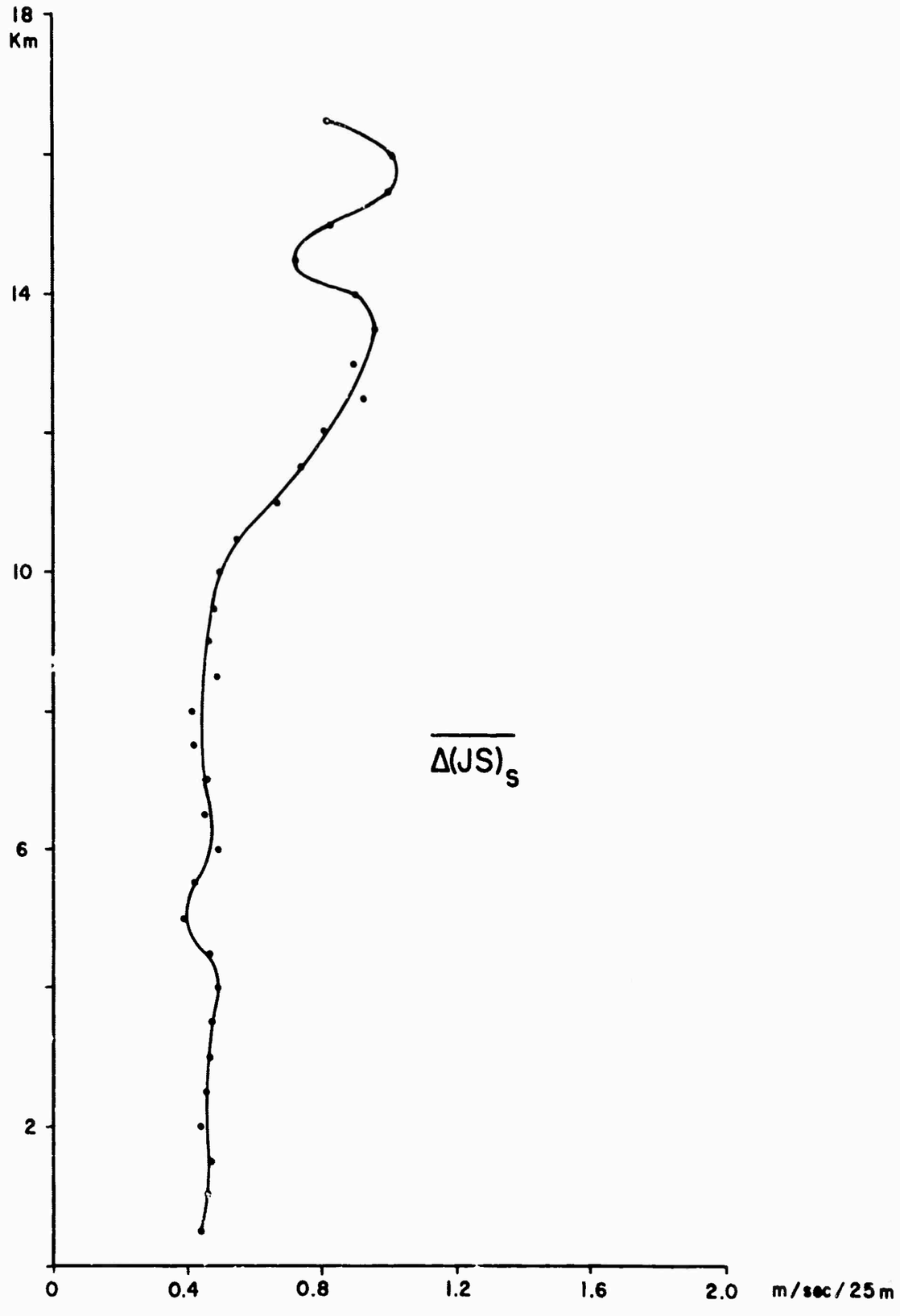


Fig. 30. Mean short period change in Jimsphere shear.

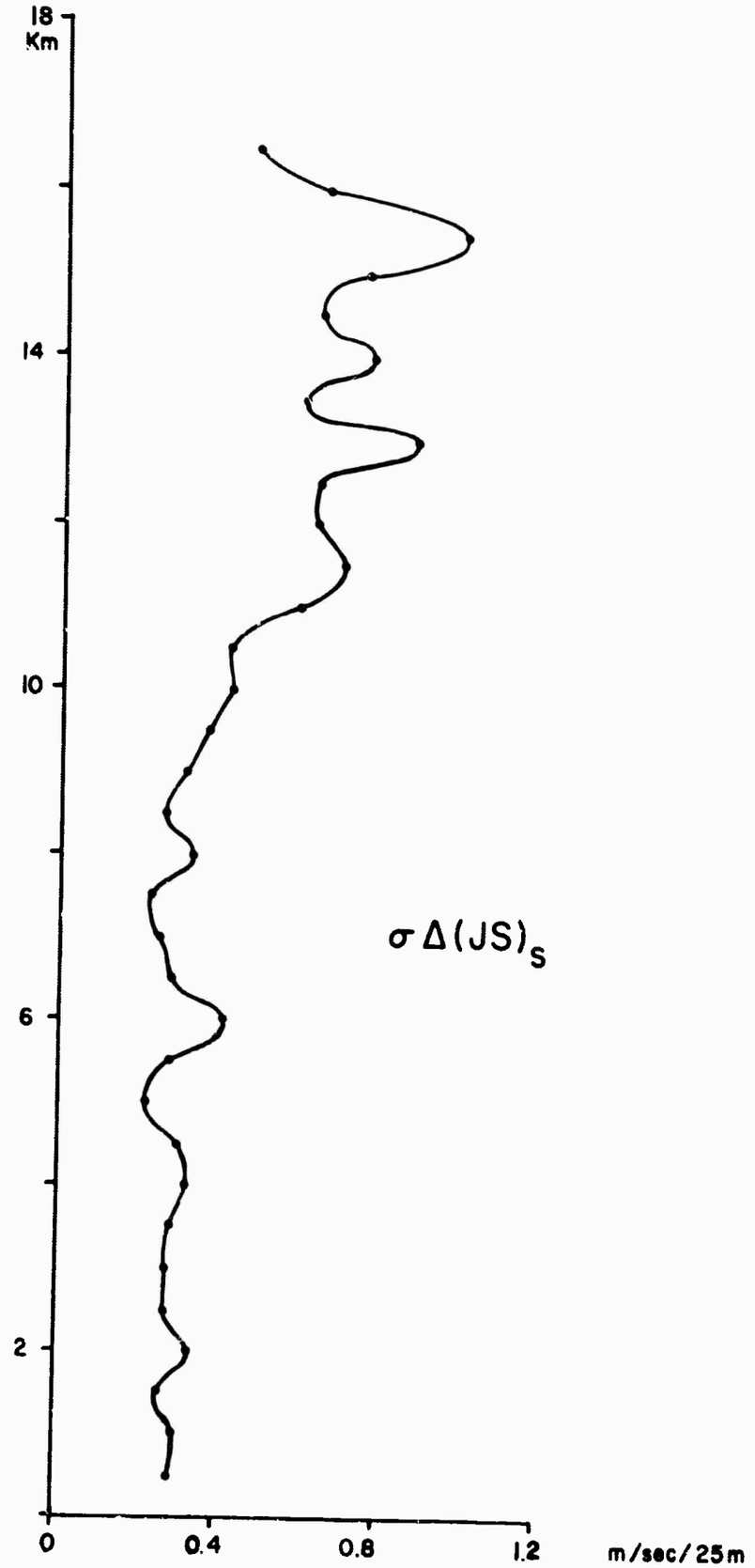


Fig. 31. Standard deviation of mean short period Jimsphere shear.

JIMSPHERE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 0 TO 2 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	13	70	84	56	28	10	4	2	2	3	0	272	2.8	19.648	18.471
9.0	10.0	3	22	21	7	6	1	0	0	0	1	0	61	0.6	9.514	0.318
8.0	9.0	6	37	14	12	8	4	1	1	2	1	0	86	0.9	8.449	0.299
7.0	8.0	6	39	36	20	13	2	2	0	0	0	1	121	1.3	7.432	0.283
6.0	7.0	11	64	61	29	11	5	3	1	0	1	0	186	1.9	6.475	0.286
5.0	6.0	34	94	86	38	12	3	1	0	0	0	0	268	2.8	5.464	0.288
4.0	5.0	50	143	111	43	26	5	4	1	0	0	0	383	4.0	4.450	0.288
3.0	4.0	92	268	165	79	10	4	0	1	0	0	0	619	6.5	3.448	0.288
2.0	3.0	211	624	342	82	8	13	3	0	0	0	0	1283	13.4	2.445	0.294
1.0	2.0	848	1145	248	44	21	7	2	2	1	1	0	2317	24.1	1.448	0.287
0.5	1.0	1002	557	129	35	11	5	2	1	2	0	0	1744	18.2	0.737	0.144
0.0	0.5	1553	542	115	25	11	7	2	0	0	0	0	2255	23.5	0.238	0.144
TOTAL		3829	3605	1410	470	167	66	24	9	7	7	1	9595			
PERCENT		39.9	37.6	14.7	4.9	1.7	0.7	0.3	0.1	0.1	0.1	0.0				
MEAN		0.149	0.360	0.602	0.851	1.110	1.381	1.619	1.878	2.391	3.896	7.348				
ST. DEV		0.063	0.071	0.071	0.066	0.069	0.080	0.089	0.075	0.219	0.358	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 2 TO 4 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	24	138	100	37	15	17	3	3	2	1	2	342	2.6	17.856	12.645
9.0	10.0	3	33	17	8	1	2	0	0	0	0	0	64	0.5	9.476	0.287
8.0	9.0	15	48	27	20	3	3	4	1	0	0	0	121	0.9	8.455	0.292
7.0	8.0	19	66	27	14	6	1	0	0	0	0	0	133	1.0	7.480	0.292
6.0	7.0	23	97	43	14	9	0	0	1	2	0	0	189	1.4	6.439	0.284
5.0	6.0	46	141	75	16	11	2	2	0	0	0	0	293	2.2	5.477	0.286
4.0	5.0	83	219	121	34	8	2	0	1	0	0	0	468	3.6	4.457	0.291
3.0	4.0	156	375	178	47	18	1	2	0	3	0	0	780	5.9	3.464	0.287
2.0	3.0	357	776	261	61	22	3	2	0	1	0	0	1483	11.3	2.438	0.287
1.0	2.0	1068	1310	477	109	15	6	0	1	1	0	0	2987	22.7	1.442	0.287
0.5	1.0	1352	1075	209	53	6	7	0	1	2	0	0	2705	20.5	0.737	0.143
0.0	0.5	2516	820	209	50	9	3	1	0	0	1	0	3609	27.4	0.241	0.143
TOTAL		5662	5098	1744	463	123	47	19	8	11	2	2	13174			
PERCENT		43.0	38.7	13.2	3.5	0.9	0.4	0.1	0.1	0.1	0.0	0.0				
MEAN		0.151	0.356	0.600	0.849	1.095	1.342	1.599	1.834	2.432	3.323	7.576				
ST. DEV		0.061	0.069	0.070	0.069	0.066	0.070	0.071	0.050	0.328	0.802	0.796				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 4 TO 6 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	23	116	80	38	14	6	6	1	2	0	0	286	2.1	21.718	17.234
9.0	10.0	4	24	17	5	1	1	0	0	0	0	0	52	0.4	9.532	0.302
8.0	9.0	13	27	23	3	1	2	0	0	0	0	0	69	0.5	8.470	0.263
7.0	8.0	7	51	26	8	2	0	0	0	0	0	0	94	0.7	7.499	0.283
6.0	7.0	20	60	36	10	2	0	1	0	0	0	0	135	1.0	6.474	0.295
5.0	6.0	33	104	61	14	3	0	0	0	0	0	0	215	1.6	5.462	0.294
4.0	5.0	61	169	72	27	9	3	1	1	0	0	0	343	2.5	4.458	0.298
3.0	4.0	94	312	126	57	12	5	1	0	0	0	0	607	4.5	3.444	0.279
2.0	3.0	296	536	265	56	19	6	2	0	0	0	0	1180	8.7	2.419	0.260
1.0	2.0	861	1267	473	153	39	15	4	0	2	0	0	2794	20.5	1.425	0.264
0.5	1.0	1152	1384	385	85	10	7	1	0	0	1	0	3025	22.2	0.730	0.145
0.0	0.5	2982	1392	322	76	25	3	1	0	3	0	1	4805	35.3	0.239	0.141
TOTAL		5826	5442	1886	538	137	48	17	2	7	1	1	13605			
PERCENT		40.6	40.0	13.9	4.0	1.0	0.4	0.1	0.0	0.1	0.0	0.0				
MEAN		0.152	0.358	0.598	0.847	1.104	1.359	1.607	1.829	2.258	3.639	5.283				
ST. DEV		0.061	0.070	0.070	0.068	0.074	0.078	0.087	0.011	0.123	0.000	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 6 TO 8 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	33	79	46	6	1	2	1	0	0	0	0	164	1.2	21.248	21.507
9.0	10.0	3	17	8	2	0	0	0	0	0	0	0	30	0.2	9.451	0.321
8.0	9.0	11	20	7	3	0	0	0	0	0	0	0	41	0.3	8.433	0.269
7.0	8.0	9	22	6	0	0	1	0	0	0	1	0	39	0.3	7.472	0.260
6.0	7.0	30	33	10	1	0	0	0	0	0	0	0	74	0.5	6.526	0.294
5.0	6.0	29	62	17	3	2	0	1	0	1	0	0	115	0.8	5.435	0.284
4.0	5.0	51	71	21	9	5	1	0	0	0	0	0	158	1.1	4.457	0.292
3.0	4.0	108	134	59	21	8	2	2	0	0	0	0	334	2.4	3.432	0.289
2.0	3.0	223	345	162	38	23	8	2	1	2	1	0	805	5.8	2.434	0.276
1.0	2.0	627	1016	456	167	55	21	3	2	0	0	0	2347	16.9	1.398	0.284
0.5	1.0	1105	1585	545	112	17	10	1	0	0	0	3	3378	24.4	0.714	0.141
0.0	0.5	3916	1995	367	65	19	5	0	2	3	0	0	6372	46.0	0.239	0.141
TOTAL		6145	5379	1700	427	130	50	10	5	6	2	3	13857			
PERCENT		44.3	38.8	12.3	3.1	0.9	0.4	0.1	0.0	0.0	0.0	0.0				
MEAN		0.151	0.356	0.597	0.852	1.119	1.365	1.595	1.828	2.233	3.139	5.071				
ST. DEV		0.062	0.070	0.067	0.072	0.074	0.071	0.080	0.068	0.142	0.001	2.360				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 8 TO 10 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	7	33	19	2	1	0	0	1	1	2	0	66	0.5	16.867	9.914
9.0	10.0	4	6	6	2	0	0	0	0	0	0	0	18	0.1	9.496	0.325
8.0	9.0	5	13	8	2	0	0	0	0	1	0	0	29	0.2	8.431	0.293
7.0	8.0	5	11	11	1	0	0	0	0	0	0	0	28	0.2	7.528	0.241
6.0	7.0	10	26	15	3	1	0	0	0	0	0	0	55	0.4	6.514	0.274
5.0	6.0	12	41	17	6	0	0	0	0	0	0	0	76	0.5	5.451	0.293
4.0	5.0	23	79	29	14	2	1	2	0	2	0	0	152	1.1	4.427	0.278
3.0	4.0	51	136	43	7	2	2	2	0	5	1	0	249	1.8	3.444	0.297
2.0	3.0	101	216	78	45	24	11	6	1	8	2	0	492	3.5	2.416	0.292
1.0	2.0	331	708	421	233	101	37	9	3	2	2	0	1847	13.2	1.386	0.274
0.5	1.0	775	1678	762	234	27	7	4	3	3	3	1	3467	24.8	0.713	0.141
0.0	0.5	4493	2412	449	85	42	12	7	4	10	7	0	7521	53.7	0.226	0.140
TOTAL		5817	5359	1858	604	200	70	30	12	32	17	1	14000			
PERCENT		41.5	38.3	13.3	4.3	1.4	0.5	0.2	0.1	0.2	0.1	0.0				
MEAN		0.153	0.358	0.603	0.851	1.100	1.353	1.618	1.841	2.314	3.797	5.025				
ST. DEV		0.062	0.070	0.070	0.069	0.065	0.072	0.079	0.068	0.292	0.648	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 10 TO 12 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	1	5	3	2	0	0	0	0	0	0	0	11	0.1	23.454	21.694
9.0	10.0	0	4	3	0	0	0	0	0	1	0	0	8	0.1	9.582	0.277
8.0	9.0	0	7	3	0	0	0	0	0	0	0	0	10	0.1	8.521	0.300
7.0	8.0	0	7	6	0	0	0	1	0	0	0	0	14	0.1	7.443	0.288
6.0	7.0	1	9	8	1	0	0	0	0	0	0	0	19	0.1	6.459	0.325
5.0	6.0	0	17	4	2	1	1	2	3	1	0	0	31	0.2	5.505	0.284
4.0	5.0	4	26	15	6	8	3	0	0	4	3	0	69	0.5	4.455	0.265
3.0	4.0	16	63	29	16	12	9	4	6	15	5	0	175	1.3	3.420	0.290
2.0	3.0	41	106	99	61	29	18	24	26	25	4	0	433	3.1	2.399	0.265
1.0	2.0	184	608	451	361	223	125	66	33	14	2	0	2067	14.9	1.389	0.273
0.5	1.0	499	1527	1089	402	110	36	12	1	5	1	1	3683	26.6	0.710	0.139
0.0	0.5	3855	2692	664	164	67	36	18	4	9	10	1	7322	52.9	0.232	0.142
TOTAL		4401	5071	2374	1015	452	228	127	73	74	25	2	13842			
PERCENT		31.8	36.6	17.2	7.3	3.3	1.6	0.9	0.5	0.5	0.2	0.0				
MEAN		0.156	0.366	0.608	0.859	1.115	1.360	1.614	1.862	2.304	3.633	7.381				
ST. DEV		0.060	0.071	0.071	0.071	0.074	0.069	0.070	0.068	0.242	0.538	1.936				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

WINDSPHERE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 12 TO 14 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	0	1	0	0	0	0	0	0	0	0	1	2	0.0	11.719	0.764
9.0	10.0	0	3	0	0	0	1	0	0	0	0	2	6	0.0	9.332	0.231
8.0	9.0	1	1	0	0	0	0	0	0	0	0	0	2	0.0	8.737	0.120
7.0	8.0	0	2	2	2	3	0	2	0	0	2	2	15	0.1	7.459	0.270
6.0	7.0	0	3	0	1	1	1	3	0	0	1	1	11	0.1	6.448	0.207
5.0	6.0	0	2	1	0	2	2	1	0	1	6	2	17	0.1	5.547	0.290
4.0	5.0	1	1	4	4	3	2	4	4	9	13	1	46	0.3	4.373	0.294
3.0	4.0	2	6	19	26	13	19	6	8	38	19	0	156	1.2	3.388	0.258
2.0	3.0	6	69	87	105	86	66	64	66	80	14	0	643	4.8	2.372	0.268
1.0	2.0	49	362	650	656	518	289	124	67	25	2	2	2744	20.4	1.375	0.269
0.5	1.0	218	1221	1245	556	185	71	25	10	10	6	0	3547	26.4	0.727	0.141
0.0	0.5	2474	2421	839	280	113	61	22	16	12	5	0	6245	46.5	0.231	0.142
TOTAL		2751	4092	2867	1630	926	512	251	171	175	68	11	13434			
PERCENT		20.5	30.5	21.2	12.1	6.9	3.8	1.9	1.3	1.3	0.5	0.1				
MEAN		0.158	0.372	0.615	0.862	1.110	1.355	1.616	1.866	2.357	3.650	6.032				
ST. DEV		0.060	0.071	0.072	0.071	0.070	0.068	0.074	0.072	0.279	0.478	0.753				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 14 TO 16 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	0	1	2	7	7	3	1	0	2	1	2	26	0.2	14.632	0.102
9.0	10.0	0	0	0	0	2	1	0	0	1	1	0	5	0.0	9.332	0.357
8.0	9.0	0	1	2	4	1	1	3	1	0	0	0	13	0.1	8.333	0.296
7.0	8.0	0	0	0	1	6	2	2	1	2	3	1	18	0.2	7.428	0.233
6.0	7.0	0	1	6	4	8	5	1	0	4	8	4	41	0.4	6.427	0.262
5.0	6.0	0	2	7	10	17	12	5	4	9	5	0	71	0.6	5.486	0.292
4.0	5.0	0	2	17	35	30	13	5	10	32	16	0	160	1.5	4.387	0.285
3.0	4.0	1	10	64	72	57	46	35	28	60	9	0	382	3.5	3.413	0.271
2.0	3.0	1	55	192	230	206	153	103	62	69	3	0	1074	9.8	2.430	0.282
1.0	2.0	24	399	957	878	446	231	71	36	12	0	0	3054	27.9	1.424	0.260
0.5	1.0	131	980	892	363	113	45	22	9	6	0	0	2561	23.4	0.741	0.145
0.0	0.5	1245	1298	590	215	110	40	20	9	7	1	0	3541	32.3	0.238	0.143
TOTAL		1402	2749	2729	1819	1003	552	274	160	204	47	7	10946			
PERCENT		12.8	25.1	24.9	16.6	9.2	5.0	2.5	1.5	1.9	0.4	0.1				
MEAN		0.160	0.380	0.619	0.863	1.111	1.365	1.619	1.854	2.335	3.622	6.416				
ST. DEV		0.061	0.071	0.071	0.071	0.071	0.070	0.071	0.071	0.265	0.514	0.771				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 16 TO 18 KILOMETERS

DIRECTION (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	0	1	0	8	4	5	10	2	6	8	1	45	0.8	17.340	8.869
9.0	10.0	0	1	1	2	3	3	0	1	0	2	0	13	0.2	9.494	0.185
8.0	9.0	0	3	3	3	6	6	3	2	0	0	1	27	0.5	8.548	0.286
7.0	8.0	1	2	4	2	11	4	2	1	9	1	0	37	0.7	7.426	0.288
6.0	7.0	0	3	7	13	15	9	6	2	9	7	0	71	1.3	6.516	0.272
5.0	6.0	2	2	16	25	24	22	14	5	16	3	0	129	2.4	5.425	0.262
4.0	5.0	0	9	28	37	33	35	13	15	25	5	1	201	3.8	4.427	0.292
3.0	4.0	4	15	57	91	98	56	47	25	26	2	0	421	7.9	3.426	0.291
2.0	3.0	5	57	189	198	150	82	46	18	17	0	1	753	14.2	2.431	0.289
1.0	2.0	39	299	499	346	155	54	12	10	14	2	2	1432	27.0	1.461	0.288
0.5	1.0	113	420	291	105	46	24	11	3	5	1	1	1020	19.3	0.746	0.143
0.0	0.5	455	352	175	82	45	20	6	1	5	5	1	1147	21.7	0.238	0.148
TOTAL		619	1174	1250	912	590	320	170	85	132	36	8	5296			
PERCENT		11.7	22.2	23.6	17.2	11.1	6.0	3.2	1.6	2.5	0.7	0.2				
MEAN		0.154	0.385	0.622	0.865	1.119	1.364	1.620	1.858	2.363	3.712	6.036				
ST. DEV		0.068	0.072	0.072	0.070	0.074	0.072	0.073	0.073	0.276	0.618	0.936				

JIMSPHERE - PRESSURE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 0 TO 2 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	2	2	3	7	13	13	26	36	39	11	152		.358	29.216
30.0	40.0	0	2	0	5	3	5	11	6	27	24	5	88		4.692	2.764
20.0	30.0	0	2	15	22	17	27	20	17	40	33	7	200		24.215	2.944
15.0	20.0	0	7	17	26	30	36	28	24	48	31	8	255	3.4	17.275	1.452
10.0	15.0	0	17	48	62	91	81	49	43	113	24	2	530	7.2	12.091	1.488
5.0	10.0	14	94	233	272	219	162	139	110	163	32	2	1440	19.4	7.143	1.414
4.0	5.0	13	69	124	108	77	46	32	18	25	5	0	517	7.0	4.452	0.289
3.0	4.0	27	150	165	144	84	34	21	14	17	2	0	658	8.9	3.451	0.281
2.0	3.0	53	292	237	158	66	38	16	12	16	2	0	890	12.0	2.488	0.290
1.0	2.0	240	429	208	124	75	26	19	13	13	6	0	1153	15.6	1.476	0.288
0.0	1.0	640	415	209	113	65	30	21	12	21	9	0	1527	20.6	0.467	0.293
TOTAL		987	1479	1259	1037	734	498	369	295	519	204	35	7416			
PERCENT		13.3	20.0	16.9	14.0	9.9	6.7	5.0	4.0	7.0	2.8	0.5				
MEAN		0.152	0.375	0.622	0.868	1.118	1.365	1.618	1.866	2.395	3.625	6.089				
ST. DEV		0.066	0.072	0.073	0.072	0.071	0.070	0.074	0.069	0.279	0.461	0.961				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 2 TO 4 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	8	11	18	22	16	17	30	42	13	2	199	1.6	59.817	22.445
30.0	40.0	0	5	9	18	27	22	33	11	36	14	0	175	1.4	34.179	2.994
20.0	30.0	1	9	31	35	52	44	48	25	76	50	5	376	3.0	23.917	2.841
15.0	20.0	0	13	23	63	47	61	54	31	85	28	1	406	3.3	17.242	1.394
10.0	15.0	1	29	88	151	129	158	96	52	123	33	5	865	7.0	12.188	1.420
5.0	10.0	27	164	384	463	381	236	142	135	238	77	7	2304	18.6	7.074	1.404
4.0	5.0	14	113	211	171	118	72	51	52	86	10	0	898	7.2	4.487	0.293
3.0	4.0	40	184	211	174	150	119	68	54	74	11	1	1086	8.8	3.482	0.287
2.0	3.0	81	342	312	244	192	111	62	42	61	10	0	1457	11.8	2.482	0.280
1.0	2.0	307	563	438	286	150	87	61	38	70	7	0	2007	16.2	1.480	0.286
0.0	1.0	906	683	372	228	138	93	57	39	89	15	0	2620	21.1	0.497	0.287
TOTAL		1377	2113	2090	1851	1906	1019	759	509	980	268	21	12393			
PERCENT		11.1	17.0	16.9	14.9	11.3	8.2	6.1	4.1	7.9	2.2	0.2				
MEAN		0.159	0.375	0.621	0.871	1.119	1.368	1.623	1.871	2.365	3.549	6.993				
ST. DEV		0.059	0.072	0.071	0.072	0.071	0.073	0.073	0.073	0.262	0.470	1.004				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

ATMOSPHERE - PRESSURE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 4 TO 6 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	6	11	20	18	23	22	31	60	30	0	221	1.7	79.578	35.291
30.0	40.0	0	1	3	6	19	14	21	11	35	21	0	131	1.0	34.573	2.826
20.0	30.0	0	8	16	33	35	37	48	48	114	64	3	406	3.1	24.272	2.925
15.0	20.0	2	5	17	29	39	70	75	79	104	54	7	481	3.7	17.242	1.437
10.0	15.0	0	27	50	95	115	141	109	86	163	95	1	882	6.8	12.120	1.448
5.0	10.0	13	115	266	278	317	294	198	157	392	217	17	2264	17.3	7.032	1.424
4.0	5.0	13	103	98	119	113	103	65	54	178	47	2	895	6.9	4.480	0.287
3.0	4.0	24	115	151	170	149	121	95	88	209	34	0	1156	8.9	3.473	0.292
2.0	3.0	56	220	279	272	183	155	159	100	124	21	0	1569	12.0	2.476	0.288
1.0	2.0	156	429	407	345	245	174	116	80	122	14	0	2088	16.0	1.467	0.291
0.0	1.0	758	786	483	297	189	160	98	80	98	19	1	2969	22.7	0.476	0.284
TOTAL		1022	1815	1781	1664	1922	1292	1006	814	1599	616	51	13062			
PERCENT		7.8	13.9	13.6	12.7	10.9	9.9	7.7	6.2	12.2	4.7	0.2				
MEAN		0.158	0.376	0.623	0.871	1.120	1.373	1.622	1.868	2.405	3.587	5.631				
ST. DEV		0.061	0.074	0.072	0.072	0.072	0.071	0.072	0.071	0.278	0.478	0.514				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 6 TO 8 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	3	10	15	20	25	24	25	52	8	0	182	1.4	70.085	29.013
30.0	40.0	1	4	3	15	22	17	19	9	10	0	4	105	0.8	34.867	2.975
20.0	30.0	2	12	19	29	41	38	24	16	56	11	9	257	1.9	24.118	2.771
15.0	20.0	2	13	14	26	32	22	25	26	46	63	2	271	2.0	17.229	1.408
10.0	15.0	6	33	36	58	74	75	64	40	119	150	23	678	5.0	12.098	1.409
5.0	10.0	16	75	139	229	219	182	159	143	487	278	22	1949	14.5	7.027	1.416
4.0	5.0	13	40	63	97	81	94	83	62	180	101	2	816	6.1	4.462	0.287
3.0	4.0	25	53	143	148	149	160	129	137	245	114	2	1305	9.7	3.469	0.295
2.0	3.0	51	127	193	237	287	231	191	144	269	51	6	1789	13.3	2.459	0.287
1.0	2.0	112	287	426	458	379	288	195	121	164	28	6	2464	18.3	1.470	0.287
0.0	1.0	696	886	678	452	302	214	145	95	164	33	2	3665	27.2	0.468	0.287
TOTAL		924	1533	1724	1765	1609	1346	1058	816	1792	837	78	13481			
PERCENT		6.9	11.4	12.8	13.1	11.9	10.0	7.8	6.1	13.3	6.2	0.6				
MEAN		0.162	0.379	0.628	0.875	1.123	1.369	1.617	1.866	2.415	3.634	5.870				
ST. DEV		0.060	0.073	0.073	0.073	0.072	0.073	0.071	0.070	0.285	0.494	0.855				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - PRESSURE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 8 TO 10 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	0	1	10	14	12	8	19	42	53	10	187	1.4	63.287	27.728
30.0	40.0	1	2	1	2	6	8	7	6	36	29	3	101	0.7	34.804	2.892
20.0	30.0	1	2	1	10	6	15	18	15	48	50	4	170	1.2	24.181	2.823
15.0	20.0	1	0	8	13	14	23	41	26	46	41	13	224	1.6	17.464	1.443
10.0	15.0	0	3	16	28	40	55	33	37	117	118	2	449	3.3	12.052	1.429
5.0	10.0	0	28	55	86	130	129	167	156	467	309	41	1568	11.5	6.984	1.393
4.0	5.0	3	18	30	55	60	63	96	77	219	163	9	793	5.8	4.453	0.290
3.0	4.0	7	37	63	99	100	124	128	108	243	144	5	1158	8.5	3.475	0.292
2.0	3.0	10	68	165	199	240	237	222	202	444	97	10	1894	13.9	2.447	0.285
1.0	2.0	36	277	391	492	496	384	261	160	251	79	9	2836	20.8	1.459	0.290
0.0	1.0	687	1059	814	508	307	208	158	127	206	104	16	4224	31.0	0.472	0.289
TOTAL		746	1494	1565	1532	1409	1258	1159	933	2219	1187	122	13604			
PERCENT		5.5	11.0	11.4	11.3	10.4	9.2	8.5	6.9	16.3	8.7	0.9				
MEAN		0.160	0.379	0.625	0.873	1.121	1.374	1.622	1.877	2.420	3.651	5.753				
ST. DEV		0.058	0.072	0.074	0.072	0.073	0.072	0.072	0.071	0.282	0.516	0.709				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 10 TO 12 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	0	0	0	0	0	1	0	8	44	30	83	0.6	61.449	21.583
30.0	40.0	0	0	0	0	0	0	0	0	14	26	15	55	0.4	33.562	2.838
20.0	30.0	0	0	0	0	1	2	7	17	86	60	63	236	1.7	24.128	2.911
15.0	20.0	0	0	0	3	3	6	7	6	60	75	94	254	1.9	17.055	1.391
10.0	15.0	0	0	1	6	7	14	21	20	121	253	212	655	4.8	12.161	1.418
5.0	10.0	0	2	13	40	52	84	97	119	700	974	582	2663	19.7	7.038	1.389
4.0	5.0	0	3	17	21	33	56	63	56	243	357	83	932	6.9	4.473	0.285
3.0	4.0	2	17	20	64	73	87	83	107	377	338	101	1269	9.4	3.486	0.293
2.0	3.0	1	20	64	111	106	154	171	176	464	226	79	1572	11.6	2.488	0.290
1.0	2.0	11	94	221	279	350	332	247	180	370	245	88	2417	17.8	1.461	0.288
0.0	1.0	298	571	494	442	335	244	171	179	314	227	131	3406	25.2	0.479	0.289
TOTAL		312	707	830	966	960	979	868	860	2757	2825	1478	13542			
PERCENT		2.3	5.2	6.1	7.1	7.1	7.2	6.4	6.4	20.4	20.9	10.9				
MEAN		0.162	0.385	0.631	0.882	1.129	1.375	1.620	1.872	2.467	3.870	6.867				
ST. DEV		0.069	0.071	0.075	0.071	0.070	0.070	0.072	0.073	0.284	0.561	1.741				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - PRESSURE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 12 TO 14 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	0	0	0	0	0	0	0	0	0	7	7	0.1	42.122	1.050
30.0	40.0	0	0	0	0	0	0	0	0	0	5	18	23	0.2	33.770	2.639
20.0	30.0	0	0	0	0	0	0	0	0	7	8	20	35	0.3	24.080	3.040
15.0	20.0	0	0	0	0	0	0	1	4	11	45	66	127	1.0	16.582	1.243
10.0	15.0	0	1	5	16	22	34	41	47	51	161	356	585	4.7	12.020	1.380
5.0	10.0	1	1	5	11	19	16	34	59	366	799	691	1932	15.4	7.003	1.380
4.0	5.0	0	4	18	31	41	68	86	92	203	345	83	775	6.2	4.490	0.283
3.0	4.0	1	10	33	83	136	152	173	170	391	401	98	1188	9.5	3.475	0.295
2.0	3.0	7	76	136	316	405	335	323	219	514	286	80	1634	13.1	2.469	0.296
1.0	2.0	7	76	136	316	405	335	323	219	415	223	61	2516	20.1	1.469	0.288
0.0	1.0	331	605	602	509	315	281	186	174	419	226	44	3690	29.5	0.484	0.287
TOTAL		340	697	799	966	936	888	887	769	2377	2499	1394	12512			
PERCENT		2.7	5.6	6.4	7.7	7.5	7.1	6.8	6.1	19.0	20.0	11.1				
MEAN		0.165	0.383	0.627	0.874	1.128	1.374	1.625	1.877	2.465	3.826	6.724				
ST. DEV		0.063	0.071	0.072	0.074	0.073	0.071	0.073	0.071	0.289	0.556	1.596				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 14 TO 16 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	0	0	0	0	0	0	0	0	0	7	7	0.1	42.577	1.295
30.0	40.0	0	0	0	0	0	0	0	0	0	0	53	53	0.6	33.121	2.415
20.0	30.0	0	0	0	0	0	0	0	0	1	42	224	267	2.9	23.933	2.757
15.0	20.0	0	0	0	0	0	0	0	0	7	95	297	399	4.4	17.193	1.460
10.0	15.0	0	0	0	0	0	1	1	5	43	235	561	846	9.3	12.177	1.403
5.0	10.0	0	0	0	5	14	13	32	54	386	998	652	2158	23.6	7.242	1.423
4.0	5.0	0	0	1	8	14	18	43	51	209	256	84	684	7.5	4.482	0.287
3.0	4.0	0	0	7	19	18	50	62	83	344	205	70	858	9.4	3.487	0.289
2.0	3.0	0	1	24	49	93	105	111	114	279	159	82	1017	11.1	2.482	0.292
1.0	2.0	0	42	121	236	182	128	115	80	150	118	66	1238	13.5	1.482	0.292
0.0	1.0	168	273	275	179	140	111	80	55	145	120	59	1611	17.6	0.477	0.293
TOTAL		168	316	428	496	461	426	450	446	1564	2228	2155	9139			
PERCENT		1.8	3.5	4.7	5.4	5.0	4.7	4.9	4.9	17.1	24.4	23.6				
MEAN		0.127	0.386	0.630	0.871	1.120	1.376	1.624	1.871	2.488	3.914	7.140				
ST. DEV		0.087	0.071	0.072	0.070	0.072	0.073	0.073	0.072	0.286	0.572	1.125				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

ATMOSPHERE - PRESSURE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 16 TO 18 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	0	0	0	0	0	0	0	0	11	38	49	1.6	67.790	36.320
30.0	40.0	0	0	0	0	0	0	0	0	3	16	62	81	2.6	34.269	2.356
20.0	30.0	0	0	0	0	0	1	1	2	12	35	135	186	6.0	24.335	2.826
15.0	20.0	0	0	0	0	0	0	0	2	18	71	154	245	7.8	17.250	1.495
10.0	15.0	0	0	0	0	2	0	4	10	26	116	196	354	11.3	12.288	1.405
5.0	10.0	0	0	2	7	8	18	14	19	124	338	190	721	23.1	7.262	1.399
4.0	5.0	0	1	6	4	3	10	15	13	56	78	21	207	6.6	4.509	0.300
3.0	4.0	0	0	5	7	14	27	19	14	74	48	34	242	7.7	3.462	0.292
2.0	3.0	0	5	13	14	17	17	24	23	57	46	43	259	8.3	2.496	0.278
1.0	2.0	2	24	35	41	43	32	13	19	39	59	30	337	10.8	1.495	0.296
0.0	1.0	83	63	57	20	35	16	19	11	50	61	30	445	14.2	0.453	0.309
TOTAL		85	93	119	93	122	121	109	113	459	879	933	3126			
PERCENT		2.7	3.0	3.8	3.0	3.9	3.9	3.5	3.6	14.7	28.1	29.8				
MEAN		0.072	0.384	0.629	0.895	1.130	1.379	1.624	1.879	2.542	3.906	7.468				
ST. DEV		0.092	0.073	0.077	0.070	0.069	0.079	0.071	0.071	0.284	0.583	2.231				

JIMSPHERE - MINUTE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 0 TO 2 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	2	0	8	9	7	11	13	21	3	0	74	1.0	65.809	35.975
30.0	40.0	0	1	8	4	11	5	4	2	5	3	0	43	0.6	34.289	2.800
20.0	30.0	0	3	8	14	27	25	13	6	22	15	4	137	1.8	24.725	3.145
15.0	20.0	2	6	16	27	26	21	19	16	24	9	4	172	2.3	17.332	1.416
10.0	15.0	3	32	58	47	67	38	32	12	33	14	1	340	4.6	12.033	1.413
5.0	10.0	30	153	241	210	157	99	47	44	59	7	1	1048	14.0	6.927	1.405
4.0	5.0	19	88	148	120	76	37	20	11	11	2	0	532	7.1	4.461	0.285
3.0	4.0	44	187	231	146	65	25	8	13	8	2	0	729	9.8	3.477	0.288
2.0	3.0	89	375	286	148	57	32	13	11	9	0	0	1020	13.7	2.446	0.291
1.0	2.0	320	603	249	123	55	31	25	15	8	1	0	1430	19.1	1.443	0.288
0.0	1.0	896	551	256	115	58	38	22	8	8	3	0	1946	26.0	0.475	0.288
TOTAL		1403	2001	1301	961	802	358	219	151	211	59	10	7471			
PERCENT		18.8	26.8	20.1	12.9	8.1	4.8	2.9	2.0	2.8	0.8	0.1				
MEAN		0.157	0.368	0.614	0.863	1.118	1.362	1.617	1.860	2.356	3.652	6.120				
ST. DEV		0.063	0.072	0.072	0.072	0.074	0.074	0.074	0.071	0.282	0.496	0.975				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 2 TO 4 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	9	7	11	16	10	1	6	12	9	1	78	0.7	64.788	31.118
30.0	40.0	0	4	4	10	9	8	9	1	8	1	0	54	0.5	33.991	3.163
20.0	30.0	2	20	26	35	41	25	19	14	18	5	0	203	1.7	23.890	2.967
15.0	20.0	4	21	48	35	39	29	21	13	25	1	0	236	2.0	17.354	1.453
10.0	15.0	11	69	85	76	112	60	19	13	23	2	0	470	3.9	12.088	1.406
5.0	10.0	52	239	419	350	204	89	55	31	19	1	0	1459	12.2	6.900	1.373
4.0	5.0	37	185	176	101	58	40	29	8	11	2	0	641	5.4	4.461	0.290
3.0	4.0	58	326	252	150	94	54	34	13	8	1	0	990	8.3	3.460	0.282
2.0	3.0	149	526	342	197	137	45	25	7	5	0	0	1433	12.0	2.454	0.286
1.0	2.0	545	857	367	240	92	36	13	9	5	0	1	2365	19.8	1.460	0.288
0.0	1.0	1898	1272	464	219	99	49	17	7	6	2	0	4033	33.7	0.464	0.287
TOTAL		2756	3528	2390	1424	997	445	236	122	138	29	2	11966			
PERCENT		23.0	29.5	20.0	11.9	8.3	3.7	2.0	1.0	1.2	0.2	0.0				
MEAN		0.154	0.370	0.615	0.861	1.115	1.364	1.615	1.854	2.368	3.615	5.556				
ST. DEV		0.062	0.072	0.072	0.071	0.074	0.071	0.070	0.073	0.271	0.617	0.421				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - MINUTE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 4 TO 6 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	6	15	20	14	9	1	0	2	0	0	67	0.5	70.115	32.828
30.0	40.0	2	3	6	12	5	2	1	0	0	0	0	31	0.3	34.470	3.140
20.0	30.0	1	13	20	24	10	10	4	1	2	0	0	85	0.7	24.034	2.878
15.0	20.0	4	13	27	21	22	24	13	3	6	0	0	133	1.1	17.049	1.409
10.0	15.0	4	43	81	79	45	25	8	2	6	0	0	293	2.4	12.130	1.409
5.0	10.0	38	235	297	196	98	50	25	16	26	0	0	981	8.0	6.891	1.379
4.0	5.0	18	164	124	74	59	22	14	5	6	0	0	486	4.0	4.486	0.286
3.0	4.0	61	256	209	133	83	33	21	11	5	0	0	807	6.6	3.454	0.288
2.0	3.0	165	456	343	201	108	61	18	14	5	1	1	1373	11.2	2.448	0.283
1.0	2.0	442	893	600	349	167	52	19	15	8	0	0	2545	20.8	1.442	0.279
0.0	1.0	2291	1062	775	295	117	43	18	12	3	1	0	5617	44.3	0.439	0.296
TOTAL		3026	3944	2492	1404	728	331	142	79	69	2	1	12218			
PERCENT		24.8	32.3	20.4	11.5	6.0	2.7	1.2	0.6	0.6	0.0	0.0				
MEAN		0.154	0.367	0.613	0.859	1.119	1.360	1.613	1.858	2.293	3.384	5.393				
ST. DEV		0.061	0.071	0.072	0.071	0.072	0.074	0.067	0.068	0.238	0.340	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 6 TO 8 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	1	4	10	13	11	9	10	3	1	0	0	62	0.5	93.520	46.494
30.0	40.0	0	5	6	11	4	1	1	2	0	0	0	30	0.2	33.576	2.537
20.0	30.0	1	14	26	26	18	14	9	3	18	1	0	130	1.0	24.041	2.748
15.0	20.0	1	14	39	37	17	10	12	6	6	0	0	142	1.1	17.260	1.471
10.0	15.0	4	44	53	46	46	38	19	8	39	12	0	309	2.4	12.076	1.409
5.0	10.0	26	124	139	150	154	114	99	85	173	27	0	1091	8.4	6.871	1.370
4.0	5.0	16	77	82	75	86	59	44	24	63	20	0	546	4.2	4.463	0.287
3.0	4.0	39	104	161	144	109	83	65	57	109	18	0	889	6.8	3.462	0.288
2.0	3.0	82	215	281	319	221	153	89	71	127	12	0	1570	12.1	2.452	0.287
1.0	2.0	203	632	686	506	370	235	108	67	59	9	0	2875	22.1	1.448	0.289
0.0	1.0	1568	1707	985	554	455	131	81	30	40	7	3	5341	41.1	0.462	0.293
TOTAL		1921	2940	2468	1881	1291	847	537	356	635	106	3	12985			
PERCENT		14.8	22.6	19.0	14.5	9.9	6.5	4.1	2.7	4.9	0.8	0.0				
MEAN		0.157	0.375	0.619	0.866	1.116	1.361	1.619	1.870	2.387	3.427	5.118				
ST. DEV		0.059	0.072	0.072	0.071	0.072	0.071	0.068	0.073	0.271	0.357	0.100				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - MINUTE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 8 TO 10 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	0	0	2	7	4	7	8	11	4	0	43	0.3	67.395	40.760
30.0	40.0	0	3	1	5	3	3	5	4	15	2	0	41	0.3	34.655	2.869
20.0	30.0	2	1	8	4	8	12	9	11	13	6	0	74	0.6	24.305	2.779
15.0	20.0	0	5	8	11	6	12	11	21	8	2	0	84	0.6	17.283	1.394
10.0	15.0	2	10	24	19	51	46	27	24	29	3	0	235	1.8	12.237	1.322
5.0	10.0	12	57	122	129	112	89	61	41	102	33	0	758	5.7	6.882	1.322
4.0	5.0	5	47	54	55	58	40	31	32	64	6	0	392	2.9	4.461	0.287
3.0	4.0	13	59	93	118	120	84	76	54	69	19	0	705	5.3	3.452	0.292
2.0	3.0	30	128	227	291	418	195	140	91	109	17	1	1427	10.7	2.424	0.282
1.0	2.0	94	481	692	821	965	337	171	79	63	11	0	3014	22.7	1.443	0.285
0.0	1.0	1569	2126	1385	741	343	168	92	39	42	15	4	6524	49.1	0.441	0.282
TOTAL		1727	2917	2614	1998	1391	990	610	404	525	118	5	13297			
PERCENT		13.0	21.9	19.7	15.0	10.5	7.4	4.6	3.0	3.9	.9	0.0				
MEAN		0.158	0.375	0.620	0.869	1.117	1.369	1.619	1.867	2.345	3.610	6.409				
ST. DEV		0.062	0.072	0.073	0.071	0.073	0.072	0.073	0.071	0.273	0.518	1.522				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 10 TO 12 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	0	1	0	0	0	3	0	3	0	0	7	0.1	43.500	4.241
30.0	40.0	1	0	1	0	1	2	7	4	1	0	0	17	0.1	35.304	2.740
20.0	30.0	0	0	1	4	6	12	1	1	19	2	0	46	0.4	23.695	2.776
15.0	20.0	1	0	4	4	3	4	2	5	14	16	0	53	0.4	17.100	1.388
10.0	15.0	0	2	8	13	7	15	18	20	30	23	1	137	1.0	12.128	1.336
5.0	10.0	0	20	42	36	47	67	64	91	200	113	16	696	5.3	6.598	1.356
4.0	5.0	3	19	34	31	41	59	49	47	115	60	11	469	3.6	4.464	0.287
3.0	4.0	8	27	50	56	68	94	74	62	192	71	5	707	5.4	3.455	0.296
2.0	3.0	9	65	122	211	217	169	156	142	237	49	0	1377	10.5	2.442	0.288
1.0	2.0	44	279	505	647	549	411	194	122	174	36	6	2967	22.6	1.429	0.287
0.0	1.0	1212	1982	1425	819	446	262	151	111	142	59	20	6629	50.6	0.447	0.283
TOTAL		1278	2394	2193	1821	1385	1095	719	605	1127	429	59	13105			
PERCENT		9.8	18.3	16.7	13.9	10.6	8.4	5.5	4.6	8.6	3.3	0.5				
MEAN		0.156	0.375	0.622	0.869	1.122	1.369	1.617	1.867	2.383	3.655	5.920				
ST. DEV		0.062	0.071	0.072	0.071	0.074	0.072	0.071	0.071	0.273	0.523	1.049				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - MINUTE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 12 TO 14 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
30.0	40.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
20.0	30.0	0	0	0	0	0	0	0	1	2	6	0	9	0.1	23.834	2.541
15.0	20.0	0	0	0	1	3	2	0	0	4	6	9	25	0.2	16.959	1.232
10.0	15.0	0	0	1	1	1	2	0	0	29	23	6	63	0.5	11.955	1.420
5.0	10.0	1	4	7	7	16	28	36	35	196	178	36	544	4.4	6.531	1.300
4.0	5.0	1	1	5	14	30	25	31	53	134	75	18	387	3.1	4.468	0.294
3.0	4.0	0	2	17	48	52	84	80	75	171	98	3	630	5.1	3.438	0.284
2.0	3.0	3	19	62	136	146	167	191	144	354	56	3	1281	10.4	2.442	0.291
1.0	2.0	10	173	398	572	571	408	283	146	239	42	1	2843	23.0	1.430	0.290
0.0	1.0	1046	1804	1406	980	517	310	182	122	182	42	2	6593	53.3	0.453	0.284
TOTAL		1061	2003	1896	1759	1536	1026	803	576	1311	526	78	12375			
PERCENT		8.6	16.2	15.3	14.2	10.8	8.3	6.5	4.7	10.6	4.3	0.6				
MEAN		0.161	0.374	0.628	0.870	1.119	1.369	1.621	1.862	2.407	3.709	6.024				
ST. DEV		0.063	0.070	0.072	0.072	0.073	0.072	0.072	0.071	0.274	0.541	1.222				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 14 TO 16 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	0	0	0	0	0	0	0	2	2	3	7	0.1	45.022	2.648
30.0	40.0	0	0	0	0	0	0	0	2	9	4	6	21	0.2	34.256	2.354
20.0	30.0	0	0	0	0	0	0	1	0	9	37	21	68	0.7	24.013	2.815
15.0	20.0	0	0	0	0	0	1	1	1	14	70	39	126	1.3	17.049	1.333
10.0	15.0	0	0	1	0	2	3	5	19	80	212	111	433	4.3	12.006	1.389
5.0	10.0	0	0	6	9	21	37	53	94	479	831	192	1722	17.1	6.933	1.376
4.0	5.0	0	0	4	9	24	33	53	59	269	241	21	713	7.1	4.484	0.282
3.0	4.0	0	3	6	26	45	106	116	130	263	199	17	1011	10.1	3.482	0.291
2.0	3.0	0	11	44	100	169	214	180	165	583	167	11	1426	14.2	2.477	0.291
1.0	2.0	2	85	253	362	323	219	189	116	304	109	8	1970	19.6	1.488	0.291
0.0	1.0	264	522	477	337	209	161	135	109	232	91	14	2549	25.4	0.476	0.288
TOTAL		266	621	791	843	793	774	744	694	2126	1962	993	10046			
PERCENT		2.6	6.2	7.9	8.4	7.9	7.7	7.4	6.9	21.2	19.5	9.9				
MEAN		0.147	0.381	0.627	0.877	1.125	1.371	1.625	1.873	2.483	3.792	5.924				
ST. DEV		0.072	0.073	0.074	0.073	0.072	0.073	0.073	0.0	0.291	0.556	0.849				

INTERVALS INCLUDE LOWER LIMIT BUT AND LESS THAN UPPER LIMIT

JIMSPHERE - MINUTE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 16 TO 18 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	0	0	0	0	0	0	1	6	10	15	32	0.8	70.183	34.989
30.0	40.0	0	0	0	0	0	1	0	.	2	11	7	22	0.5	34.398	2.652
20.0	30.0	0	0	0	1	2	6	0	0	14	41	32	90	2.2	23.528	2.652
15.0	20.0	0	0	1	0	0	2	2	6	27	58	64	160	3.8	17.038	1.357
10.0	15.0	0	0	0	1	0	5	7	10	66	163	85	343	8.2	12.154	1.394
5.0	10.0	1	1	5	5	16	35	31	65	325	386	76	966	23.1	7.126	1.390
4.0	5.0	1	1	4	9	18	15	44	39	111	57	18	317	7.6	4.484	0.283
3.0	4.0	0	3	5	20	37	44	40	36	117	59	14	375	9.0	3.460	0.275
2.0	3.0	1	10	34	61	63	75	65	44	84	52	14	503	12.0	2.490	0.290
1.0	2.0	0	49	98	111	84	59	43	32	66	39	5	585	14.0	1.486	0.297
0.0	1.0	128	154	120	93	75	33	37	15	65	49	12	781	18.7	0.465	0.303
TOTAL		131	218	267	301	301	294	269	249	883	925	342	4175			
PERCENT		3.1	5.2	6.4	7.2	7.2	6.4	6.4	6.0	21.1	22.2	8.2				
MEAN		0.101	0.380	0.637	0.878	1.122	1.376	1.618	1.881	2.485	3.807	6.035				
ST. DEV		0.095	0.071	0.079	0.070	0.074	0.072	0.076	0.073	0.285	0.551	0.979				

JIMSPHERE SHEAR - PRESSURE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 0 TO 2 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	15	72	51	14	7	3	1	0	2	3	0	168	2.2	19.818	18.632
9.0	10.0	7	16	9	5	1	0	1	0	0	1	0	40	0.5	9.479	0.288
8.0	9.0	8	22	8	5	1	0	1	0	1	0	0	46	0.6	8.463	0.288
7.0	8.0	7	25	17	7	2	0	0	0	1	0	0	59	0.8	7.460	0.289
6.0	7.0	19	39	24	9	5	2	1	0	0	0	1	100	1.3	6.472	0.303
5.0	6.0	24	76	39	14	6	1	1	0	0	1	0	162	2.1	5.477	0.306
4.0	5.0	40	89	61	21	4	2	1	0	0	0	0	218	2.8	4.459	0.277
3.0	4.0	113	222	108	34	2	4	0	0	0	0	0	483	6.3	3.439	0.286
2.0	3.0	224	483	154	16	9	1	0	0	1	0	0	890	11.6	2.447	0.289
1.0	2.0	759	817	161	23	9	3	1	0	0	0	0	1773	23.1	1.432	0.284
0.5	1.0	1037	476	82	15	7	2	2	1	1	2	0	1625	21.2	0.734	0.144
0.0	0.5	1555	471	66	15	3	4	1	1	1	0	0	2117	27.6	0.237	0.146
TOTAL		3808	2808	782	178	56	22	10	2	7	7	1	7681			
PERCENT		49.6	36.6	10.2	2.3	0.7	0.3	0.1	0.0	0.1	0.1	0.0				
MEAN		0.146	0.354	0.597	0.845	1.096	1.341	1.627	1.815	2.263	3.749	7.011				
ST. DEV		0.062	0.070	0.068	0.068	0.064	0.074	0.075	0.011	0.173	0.449	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 2 TO 4 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	47	113	68	25	12	6	5	0	2	1	1	280	2.1	21.535	36.310
9.0	10.0	16	28	12	8	2	0	0	0	0	0	0	66	0.5	9.503	0.284
8.0	9.0	13	49	17	14	3	1	2	1	0	0	0	101	0.8	8.492	0.291
7.0	8.0	24	58	21	14	2	2	0	0	0	0	0	121	0.9	7.458	0.301
6.0	7.0	31	66	36	16	4	2	0	1	1	0	0	157	1.2	6.446	0.299
5.0	6.0	52	151	45	13	6	2	0	0	0	0	0	269	2.1	5.446	0.279
4.0	5.0	100	200	100	27	5	1	1	0	0	0	0	434	3.3	4.446	0.299
3.0	4.0	158	342	125	38	7	3	0	0	2	0	0	675	5.2	3.470	0.292
2.0	3.0	409	747	202	38	6	3	2	0	1	0	0	1408	10.8	2.442	0.283
1.0	2.0	1228	1290	328	59	8	3	1	1	1	0	0	2919	22.4	1.428	0.282
0.5	1.0	1444	957	157	37	6	3	0	1	2	0	0	2607	20.0	0.730	0.145
0.0	0.5	2882	884	188	35	7	0	0	0	0	1	0	3997	30.7	0.244	0.143
TOTAL		6404	4885	1299	324	68	26	11	4	9	2	1	13033			
PERCENT		49.1	37.5	10.0	2.5	0.5	0.2	0.1	0.0	0.1	0.0	0.0				
MEAN		0.151	0.351	0.593	0.844	1.104	1.355	1.607	1.869	2.364	3.132	7.031				
ST. DEV		0.061	0.069	0.067	0.067	0.072	0.067	0.087	0.054	0.252	0.849	0.000				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JETSPHERE SHEAR - PRESSURE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 4 TO 6 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	32	114	58	27	15	7	4	1	2	0	0	260	1.9	22.605	17.942
9.0	10.0	9	15	9	4	0	0	0	0	0	0	0	37	0.3	9.459	0.279
8.0	9.0	12	35	25	4	3	0	0	0	0	0	0	79	0.6	8.498	0.286
7.0	8.0	12	35	20	3	2	0	1	0	0	0	0	73	0.5	7.544	0.286
6.0	7.0	26	70	30	6	1	0	0	0	0	0	0	133	1.0	6.421	0.300
5.0	6.0	29	110	49	7	1	0	0	0	0	0	0	196	1.4	5.444	0.297
4.0	5.0	64	186	49	17	8	3	2	0	0	0	0	329	2.4	4.424	0.295
3.0	4.0	124	313	93	30	10	4	0	0	0	0	0	574	4.2	3.481	0.286
2.0	3.0	326	559	203	36	13	3	2	0	0	0	0	1142	8.4	2.445	0.287
1.0	2.0	895	1197	394	96	23	8	1	0	0	0	0	2614	19.3	1.412	0.265
0.5	1.0	1494	1318	322	52	18	4	1	1	1	0	1	3012	22.2	0.725	0.144
0.0	0.5	3399	1418	241	48	6	4	1	0	3	1	0	5121	37.7	0.231	0.141
TOTAL		6622	5370	1493	330	100	33	12	2	6	1	1	13570			
PERCENT		48.9	39.6	11.0	2.4	0.7	0.2	0.1	0.0	0.0	0.0	0.0				
MEAN		0.152	0.354	0.595	0.848	1.098	1.354	1.612	1.878	2.291	3.798	5.121				
ST. DEV		0.061	0.070	0.068	0.072	0.079	0.071	0.071	0.114	0.213	0.000	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 6 TO 8 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	56	86	28	5	1	1	1	0	0	0	0	178	1.3	20.094	20.625
9.0	10.0	9	15	2	1	0	0	0	0	0	0	0	27	0.2	9.555	0.281
8.0	9.0	19	15	5	0	0	0	0	0	0	0	0	39	0.3	8.472	0.283
7.0	8.0	21	21	7	2	1	0	0	0	1	0	0	53	0.4	7.445	0.276
6.0	7.0	39	24	5	0	0	1	0	0	0	0	0	69	0.5	6.439	0.287
5.0	6.0	39	34	12	1	2	0	0	0	1	0	0	89	0.6	5.447	0.281
4.0	5.0	56	67	23	7	3	1	0	0	0	0	0	157	1.1	4.477	0.306
3.0	4.0	110	135	33	13	9	4	1	0	0	0	0	305	2.2	3.443	0.287
2.0	3.0	240	324	139	32	15	11	1	0	3	0	0	765	5.5	2.421	0.285
1.0	2.0	653	1009	360	111	47	12	3	1	0	0	0	2196	15.9	1.396	0.285
0.5	1.0	1116	1595	484	55	11	3	0	0	0	0	2	3266	23.6	0.712	0.140
0.0	0.5	4315	2029	267	46	13	7	0	1	3	0	1	6682	48.3	0.230	0.140
TOTAL		6673	5354	1365	273	102	40	6	2	8	0	3	13826			
PERCENT		48.3	38.7	9.9	2.0	0.7	0.3	0.0	0.0	0.1	0.0	0.0				
MEAN		0.151	0.352	0.595	0.851	1.106	1.358	1.607	1.770	2.398	0.000	6.581				
ST. DEV		0.061	0.069	0.058	0.071	0.076	0.067	0.078	0.017	0.374	0.000	2.623				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE SMEAR - PRESSURE SMEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 8 TO 10 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	12	36	14	2	0	0	0	2	1	2	0	68	0.5	17.550	10.193
9.0	10.0	4	13	6	1	0	0	0	0	0	0	0	24	0.2	9.398	0.280
8.0	9.0	8	7	7	2	0	0	0	0	1	0	0	25	0.2	8.435	0.245
7.0	8.0	13	8	5	1	0	0	0	0	0	0	0	27	0.2	7.468	0.281
6.0	7.0	16	23	16	1	0	0	0	0	0	0	0	56	0.4	6.487	0.280
5.0	6.0	18	34	15	7	0	0	0	0	0	0	0	74	0.5	5.492	0.288
4.0	5.0	22	66	37	7	1	2	0	0	1	0	0	136	1.0	4.425	0.304
3.0	4.0	53	121	31	8	2	1	2	1	3	1	0	223	1.6	3.427	0.286
2.0	3.0	114	205	62	27	13	8	3	3	7	1	0	443	3.2	2.442	0.292
1.0	2.0	317	709	364	189	83	36	7	6	2	1	0	1708	12.2	1.367	0.277
0.5	1.0	866	1605	698	193	19	5	3	1	7	4	1	3346	24.0	0.708	0.141
0.0	0.5	4796	2518	358	65	24	14	9	2	11	7	0	7822	56.1	0.228	0.140
TOTAL		6239	5345	1613	465	142	60	24	14	33	16	1	13952			
PERCENT		44.7	38.3	11.6	3.3	1.0	0.4	0.2	0.1	0.2	0.1	0.0				
MEAN		0.151	0.356	0.599	0.854	1.101	1.353	1.591	1.827	2.328	3.815	5.056				
ST. DEV		0.061	0.070	0.069	0.071	0.070	0.077	0.069	0.059	0.280	0.648	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 10 TO 12 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	1	4	4	3	0	0	0	0	0	0	0	12	0.1	22.569	21.368
9.0	10.0	0	3	4	0	0	0	0	0	1	0	0	8	0.1	9.447	0.236
8.0	9.0	0	7	5	0	0	0	0	0	0	0	0	12	0.1	8.531	0.282
7.0	8.0	1	1	5	1	0	0	0	0	0	0	0	8	0.1	7.349	0.226
6.0	7.0	1	13	7	0	0	1	0	0	0	0	0	22	0.2	6.338	0.241
5.0	6.0	1	15	4	2	1	0	2	1	1	0	0	27	0.2	5.465	0.304
4.0	5.0	7	26	14	2	3	1	0	1	7	2	0	63	0.5	4.388	0.298
3.0	4.0	11	57	26	16	7	7	2	6	12	6	0	146	1.1	3.435	0.299
2.0	3.0	45	112	86	46	28	19	26	24	25	2	0	409	3.0	2.384	0.283
1.0	2.0	180	530	448	321	179	131	53	25	19	1	0	1887	13.8	1.358	0.270
0.5	1.0	528	1533	1039	372	102	33	5	3	5	1	1	3622	26.4	0.714	0.142
0.0	0.5	3938	2683	549	159	53	25	20	6	6	7	2	7498	54.7	0.230	0.142
TOTAL		4713	4984	2237	922	373	217	108	62	76	19	3	13714			
PERCENT		34.4	36.3	16.3	6.7	2.7	1.6	0.8	0.5	0.6	0.1	0.0				
MEAN		0.153	0.363	0.605	0.855	1.110	1.355	1.620	1.869	2.295	3.702	6.000				
ST. DEV		0.062	0.070	0.070	0.070	0.074	0.070	0.070	0.077	0.256	0.942	1.994				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

ATMOSPHERIC SHEAR - PRESSURE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 12 TO 14 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
9.0	10.0	0	0	1	0	0	0	0	0	0	0	2	3	0.0	9.502	0.236
8.0	9.0	0	0	0	1	1	0	0	0	0	0		2	0.0	8.364	0.089
7.0	8.0	1	0	1	0	2	0	0	0	0	0	1	5	0.0	7.744	0.269
6.0	7.0	0	1	0	3	1	4	1	0	0	1	1	12	0.1	6.352	0.223
5.0	6.0	0	1	0	0	1	2	0	0	1	1	0	6	0.0	5.628	0.265
4.0	5.0	1	3	2	3	2	3	2	1	7	6	1	31	0.2	4.448	0.324
3.0	4.0	3	8	27	11	9	16	6	4	25	11	0	120	0.9	3.344	0.275
2.0	3.0	4	48	98	77	66	39	47	47	67	12	0	505	3.9	2.386	0.269
1.0	2.0	59	366	599	535	438	233	104	41	16	2	2	2395	18.6	1.374	0.271
0.5	1.0	229	1291	1183	533	147	38	16	6	7	5	0	3455	26.9	0.720	0.142
0.0	0.5	2551	2500	796	257	109	40	28	8	14	5	0	6308	49.1	0.231	0.143
TOTAL		2848	4218	2707	1420	776	375	204	107	137	43	7	12842			
PERCENT		22.2	32.8	21.1	11.1	6.0	2.9	1.6	0.8	1.1	0.3	0.1				
MEAN		0.157	0.370	0.613	0.861	1.111	1.359	1.607	1.867	2.322	3.538	5.831				
ST. DEV		0.061	0.071	0.071	0.072	0.069	0.070	0.074	0.067	0.257	0.474	0.758				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 14 TO 16 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	0	0	2	4	7	2	1	0	2	1	1	20	0.2	13.988	4.669
9.0	10.0	0	0	1	0	1	0	0	0	1	0	0	3	0.0	9.187	0.142
8.0	9.0	0	1	2	0	2	2	1	0	0	0	0	8	0.1	8.597	0.236
7.0	8.0	0	0	2	2	2	0	2	0	1	1	1	11	0.1	7.415	0.266
6.0	7.0	0	2	3	6	6	2	3	0	1	5	3	31	0.3	6.421	0.263
5.0	6.0	0	0	5	3	17	4	3	1	7	5	0	45	0.5	5.441	0.278
4.0	5.0	0	2	8	24	24	7	6	7	17	7	0	102	1.1	4.412	0.300
3.0	4.0	1	6	42	76	44	26	20	31	41	4	0	291	3.1	3.424	0.285
2.0	3.0	1	49	173	194	170	130	75	38	51	1	0	884	9.4	2.434	0.280
1.0	2.0	22	370	766	732	346	154	56	17	7	0	0	2470	26.3	1.411	0.281
0.5	1.0	130	951	780	277	87	32	17	2	5	0	0	2281	24.3	0.732	0.142
0.0	0.5	1172	1206	535	203	65	29	17	4	2	1	0	3234	34.5	0.241	0.143
TOTAL		1326	2587	2321	1521	771	388	201	100	135	25	5	9380			
PERCENT		14.1	27.6	24.7	16.2	8.2	4.1	2.1	1.1	1.4	0.3	0.1				
MEAN		0.161	0.379	0.618	0.863	1.112	1.357	1.615	1.870	2.318	3.583	6.299				
ST. DEV		0.060	0.072	0.070	0.069	0.071	0.070	0.069	0.070	0.261	0.477	0.481				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE SMEAN - PRESSURE SMEAN

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 16 TO 18 KILOMETERS

DIRECTION CHANGE (DEGREES)	SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0 PLUS	0	0	0	9	3	6	2	3	0	1	0	24	0.8	16.662	0.470
9.0 10.0	0	1	0	2	2	4	1	0	0	1	0	11	0.3	9.765	0.240
8.0 9.0	0	1	2	2	6	1	3	0	0	0	1	16	0.5	8.501	0.232
7.0 8.0	1	2	7	2	6	0	1	1	3	0	0	23	0.7	7.425	0.322
6.0 7.0	0	2	5	7	7	3	3	0	3	5	0	35	1.1	6.416	0.296
5.0 6.0	0	2	7	17	11	7	7	3	11	1	0	66	2.1	5.433	0.286
4.0 5.0	1	5	18	18	14	11	12	7	18	2	1	107	3.4	4.462	0.301
3.0 4.0	0	12	24	31	40	34	14	11	19	3	0	188	5.9	3.402	0.288
2.0 3.0	3	48	110	104	88	59	33	19	10	0	0	474	14.9	2.441	0.278
1.0 2.0	19	147	293	197	112	30	10	8	3	1	2	818	25.7	1.446	0.290
0.5 1.0	59	267	172	78	27	10	7	2	4	4	1	631	19.8	0.742	0.146
0.0 0.5	292	2	134	61	24	20	3	1	3	2	0	789	24.8	0.247	0.141
TOTAL	371	736	772	528	340	185	96	55	74	20	5	3182			
PERCENT	11.7	23.1	24.3	16.6	10.7	5.8	4.0	1.7	2.3	0.6	0.2				
MEAN	0.161	0.377	0.620	0.867	1.110	1.356	1.624	1.866	2.387	3.835	6.121				
ST. DEV	0.058	0.070	0.072	0.070	0.073	0.071	0.088	0.069	0.293	0.570	0.799				

JIMSPHERE SHEAR - MINUTE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 0 TO 2 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	20	73	42	9	8	2	3	1	0	3	0	161	2.0	23.266	25.098
9.0	10.0	4	17	4	1	0	0	0	0	0	0	0	26	0.3	9.455	0.244
8.0	9.0	8	32	10	4	2	2	0	0	0	1	0	59	0.7	8.526	0.301
7.0	8.0	5	32	17	5	1	0	0	0	3	0	0	63	0.8	7.518	0.296
6.0	7.0	19	34	27	5	4	1	1	0	0	0	0	91	1.1	6.433	0.284
5.0	6.0	31	69	32	12	4	1	0	0	0	1	0	150	1.9	5.485	0.293
4.0	5.0	56	109	55	8	1	2	0	0	0	0	1	232	2.9	4.448	0.282
3.0	4.0	108	210	88	26	5	3	0	0	1	1	0	440	5.5	3.445	0.284
2.0	3.0	246	454	140	25	4	1	0	0	1	0	0	870	10.8	2.438	0.288
1.0	2.0	847	842	161	30	6	4	5	0	0	0	0	1895	23.6	1.420	0.278
0.5	1.0	1078	507	65	11	5	3	1	0	1	0	0	1671	20.8	0.732	0.142
0.0	0.5	1784	476	74	12	8	7	3	0	1	1	0	2366	29.5	0.239	0.144
TOTAL		4206	2855	715	148	47	26	13	1	6	6	1	8024			
PERCENT		52.4	35.6	8.9	1.8	0.6	0.3	0.2	0.0	0.1	0.1	0.0				
MEAN		0.146	0.349	0.596	0.847	1.089	1.343	1.638	1.798	2.456	3.576	7.307				
ST. DEV		0.064	0.068	0.068	0.069	0.068	0.076	0.085	0.000	0.343	0.331	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 2 TO 4 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	42	107	50	23	9	8	1	0	2	1	0	243	1.9	20.297	27.144
9.0	10.0	7	28	15	5	4	3	0	0	0	0	0	62	0.5	9.536	0.288
8.0	9.0	8	34	9	7	2	2	1	0	0	0	0	63	0.5	8.485	0.273
7.0	8.0	23	44	25	11	3	0	1	0	0	0	0	107	0.8	7.494	0.302
6.0	7.0	36	72	26	14	3	1	1	0	0	0	0	153	1.2	6.494	0.288
5.0	6.0	61	107	51	7	3	1	0	0	0	0	0	230	1.8	5.498	0.302
4.0	5.0	91	213	73	21	4	2	1	0	1	1	0	407	3.1	4.465	0.295
3.0	4.0	198	319	101	29	2	1	0	1	0	0	0	651	5.0	3.455	0.284
2.0	3.0	391	611	157	29	1	1	2	0	0	0	0	1192	9.1	2.442	0.286
1.0	2.0	1359	1074	241	36	3	1	0	1	0	0	0	2715	20.7	1.430	0.289
0.5	1.0	1747	894	140	17	3	1	1	0	1	1	0	2805	21.4	0.725	0.144
0.0	0.5	3472	838	137	25	3	3	1	1	0	0	0	[illegible]	34.2	0.235	0.145
TOTAL		7435	4341	1025	224	40	24	9	3	4	3	0	13108			
PERCENT		56.7	33.1	7.8	1.7	0.3	0.2	0.1	0.0	0.0	0.0	0.0				
MEAN		0.146	0.346	0.591	0.843	1.089	1.362	1.597	1.823	2.326	3.689	0.000				
ST. DEV		0.061	0.069	0.068	0.069	0.066	0.074	0.079	0.058	0.309	1.027	0.000				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - MINUTE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 4 TO 6 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	51	104	34	19	11	5	3	2	2	0	0	231	1.7	24.369	22.665
9.0	10.0	4	22	7	1	2	0	0	0	0	0	0	36	0.3	9.509	0.312
8.0	9.0	14	26	11	2	0	0	0	1	0	0	0	54	0.4	8.485	0.274
7.0	8.0	13	26	14	7	0	0	0	0	0	0	0	60	0.4	7.438	0.292
6.0	7.0	22	57	19	2	1	0	0	0	0	0	0	101	0.7	6.469	0.292
5.0	6.0	28	95	20	6	0	0	0	0	0	0	0	149	1.1	5.481	0.279
4.0	5.0	63	130	36	12	3	1	0	0	0	0	0	245	1.8	4.478	0.294
3.0	4.0	142	259	46	21	8	4	0	0	0	0	0	480	3.5	3.473	0.297
2.0	3.0	348	440	162	29	5	0	0	0	0	0	0	984	7.2	2.446	0.284
1.0	2.0	1017	939	217	64	8	8	1	0	0	0	0	2254	16.6	1.417	0.277
0.5	1.0	1515	1160	226	29	4	3	1	1	3	0	0	2942	21.7	0.717	0.142
0.0	0.5	4428	1397	163	33	11	2	1	0	1	2	0	6038	44.5	0.224	0.142
TOTAL		7845	4655	955	225	53	23	6	4	6	2	0	13574			
PERCENT		56.3	34.3	7.0	1.7	0.4	0.2	0.0	0.0	0.0	0.0	0.0				
MEAN		0.144	0.344	0.593	0.849	1.107	1.364	1.618	1.791	2.171	3.459	0.000				
ST. DEV		0.061	0.067	0.068	0.067	0.068	0.067	0.069	0.028	0.174	0.527	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 6 TO 8 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	41	72	18	5	2	1	1	0	0	0	0	140	1.0	23.582	23.306
9.0	10.0	6	14	4	0	0	0	0	0	0	0	0	24	0.2	9.563	0.251
8.0	9.0	9	12	2	0	0	0	0	0	0	1	0	24	0.2	8.547	0.294
7.0	8.0	13	19	5	3	0	0	0	0	0	0	0	40	0.3	7.479	0.282
6.0	7.0	24	22	7	0	1	0	0	0	0	0	0	52	0.4	6.548	0.284
5.0	6.0	44	43	8	2	0	0	0	0	1	0	0	98	0.7	5.468	0.279
4.0	5.0	60	61	14	5	2	1	0	0	0	0	0	143	1.0	4.410	0.275
3.0	4.0	128	123	35	8	1	5	1	0	0	0	0	301	2.2	3.447	0.285
2.0	3.0	237	254	107	23	10	8	1	0	3	0	0	643	4.6	2.433	0.283
1.0	2.0	665	930	192	79	35	5	2	2	0	0	0	2010	14.5	1.394	0.286
0.5	1.0	1287	1445	411	53	14	5	0	0	0	0	0	3214	23.2	0.715	0.143
0.0	0.5	4918	1933	233	52	7	7	1	0	3	0	3	7157	51.7	0.227	0.142
TOTAL		7430	4928	1130	230	71	32	6	2	7	1	3	13846			
PERCENT		53.7	35.6	8.2	1.7	0.5	0.2	0.0	0.0	0.1	0.0	0.0				
MEAN		0.147	0.350	0.593	0.850	1.105	1.346	1.605	1.862	2.313	3.092	6.560				
ST. DEV		0.061	0.068	0.068	0.070	0.081	0.066	0.076	0.048	0.289	0.000	2.513				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - MINUTE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 8 TO 10 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	9	30	11	2	0	0	1	0	1	2	0	56	0.4	17.755	9.800
9.0	10.0	5	4	1	0	0	0	0	0	0	0	0	10	0.1	9.415	0.292
8.0	9.0	7	11	1	1	0	0	0	0	1	0	0	21	0.2	8.449	0.290
7.0	8.0	5	23	3	1	0	0	0	0	0	0	0	31	0.2	7.434	0.258
6.0	7.0	8	26	6	2	0	0	0	0	0	0	0	42	0.3	6.448	0.272
5.0	6.0	20	51	10	3	0	0	0	0	0	0	0	84	0.6	5.427	0.260
4.0	5.0	17	62	29	4	0	2	0	0	2	0	0	116	0.8	4.463	0.292
3.0	4.0	53	114	29	3	1	1	2	1	3	1	0	208	1.5	3.435	0.293
2.0	3.0	108	189	57	14	15	7	4	3	6	1	0	404	2.9	2.419	0.278
1.0	2.0	383	592	298	154	75	24	13	3	1	1	0	1544	11.0	1.352	0.271
0.5	1.0	963	1515	655	129	20	6	3	1	6	1	0	3299	23.6	0.705	0.139
0.0	0.5	5180	2565	304	67	20	15	6	4	11	8	1	8181	58.5	0.224	0.141
TOTAL		6758	5181	1404	380	131	55	29	12	37	14	1	13996			
PERCENT		48.3	37.0	10.0	2.7	0.9	0.4	0.2	0.1	0.2	0.1	0.0				
MEAN		0.148	0.352	0.595	0.850	1.090	1.359	1.625	1.875	2.415	3.882	5.246				
ST. DEV		0.061	0.070	0.068	0.072	0.065	0.065	0.061	0.088	0.277	0.649	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 10 TO 12 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	2	3	7	0	0	0	0	0	0	0	0	12	0.1	17.642	9.297
9.0	10.0	0	3	1	0	0	0	0	0	1	0	0	5	0.0	9.460	0.366
8.0	9.0	0	5	2	0	0	0	0	0	0	0	0	7	0.1	8.479	0.358
7.0	8.0	0	5	3	1	0	0	1	0	1	0	0	10	0.1	7.303	0.292
6.0	7.0	1	11	2	0	1	0	0	0	0	0	0	15	0.1	6.479	0.299
5.0	6.0	2	11	3	1	1	1	3	0	1	0	0	23	0.2	5.468	0.310
4.0	5.0	5	22	15	5	1	0	1	1	3	3	0	56	0.4	4.419	0.300
3.0	4.0	14	53	25	9	5	1	4	3	13	5	0	132	1.0	3.419	0.299
2.0	3.0	40	81	66	34	25	12	26	14	21	4	0	323	2.3	2.399	0.278
1.0	2.0	214	522	358	270	166	109	61	20	17	1	0	1738	12.6	1.348	0.272
0.5	1.0	592	1496	973	319	97	26	8	6	4	1	1	3523	25.5	0.708	0.140
0.0	0.5	4324	2794	588	133	53	21	18	6	8	7	1	7953	57.6	0.226	0.142
TOTAL		5194	5006	2042	772	349	170	122	50	69	21	2	13797			
PERCENT		37.6	36.3	14.8	5.6	2.5	1.2	0.9	0.4	0.5	0.2	0.0				
MEAN		0.151	0.359	0.604	0.857	1.106	1.355	1.615	1.876	2.277	3.704	7.354				
ST. DEV		0.062	0.070	0.071	0.070	0.072	0.070	0.074	0.072	0.242	0.563	1.947				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE SHEAR - MINUTE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 12 TO 14 KILOMETERS

DIRECTION CHANGE (DEGREES)	SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0 PLUS	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
9.0 10.0	0	0	1	0	0	0	0	0	0	0	1	2	0.0	9.715	0.028
8.0 9.0	0	0	0	0	0	0	0	0	0	0	2	2	0.0	8.286	0.230
7.0 8.0	0	0	1	1	0	0	1	0	0	2	1	6	0.0	7.271	0.247
6.0 7.0	0	1	2	0	0	2	0	0	0	0	1	6	0.0	6.188	0.082
5.0 6.0	1	2	1	2	1	1	0	1	0	3	1	13	0.1	5.388	0.328
4.0 5.0	2	4	2	6	5	1	1	0	3	11	1	36	0.3	4.404	0.311
3.0 4.0	4	4	12	9	5	8	6	3	34	19	0	104	0.8	3.455	0.274
2.0 3.0	7	50	59	65	57	46	47	36	72	10	1	450	3.4	2.389	0.271
1.0 2.0	58	376	485	495	381	222	110	36	13	2	0	2178	16.3	1.363	0.272
0.5 1.0	279	1319	1198	494	121	26	11	7	9	1	0	3465	25.9	0.719	0.143
0.0 0.5	3225	2717	723	241	99	47	26	10	12	10	0	7110	53.2	0.230	0.142
TOTAL	3576	4473	2484	1313	669	353	202	93	143	58	8	13[illegible]			
PERCENT	26.7	33.5	18.6	9.8	5.0	2.6	1.5	0.7	1.1	0.4	0.1				
MEAN	0.155	0.366	0.611	0.860	1.110	1.365	1.605	1.865	2.368	3.585	5.770				
ST. DEV	0.061	0.072	0.071	0.073	0.070	0.069	0.076	0.073	0.263	0.527	0.675				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 14 TO 16 KILOMETERS

DIRECTION CHANGE (DEGREES)	SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0 PLUS	0	0	3	4	5	1	0	1	1	1	1	17	0.2	15.024	5.118
9.0 10.0	0	1	1	1	2	0	1	0	1	0	0	7	0.1	9.419	0.302
8.0 9.0	0	0	1	2	2	3	2	0	0	0	0	10	0.1	8.474	0.247
7.0 8.0	0	1	1	3	0	3	0	0	2	0	2	12	0.1	7.465	0.302
6.0 7.0	0	3	9	5	4	5	0	2	1	5	2	36	0.3	6.419	0.292
5.0 6.0	0	1	5	6	7	6	3	1	7	6	1	43	0.4	5.501	0.325
4.0 5.0	0	7	13	32	21	10	7	5	14	11	0	120	1.2	4.420	0.276
3.0 4.0	1	10	55	74	37	35	36	23	47	5	0	323	3.1	3.413	0.284
2.0 3.0	3	62	162	172	155	104	67	58	54	2	0	839	8.0	2.415	0.282
1.0 2.0	38	409	799	699	344	178	52	22	3	0	0	2544	24.4	1.425	0.284
0.5 1.0	212	1201	851	256	90	31	16	5	5	0	0	2667	25.6	0.734	0.146
0.0 0.5	1536	1436	558	171	61	30	15	5	3	1	0	3816	36.6	0.240	0.144
TOTAL	1790	3131	2458	1425	728	406	199	122	138	31	6	10434			
PERCENT	17.2	30.0	23.6	13.7	7.0	3.9	1.9	1.2	1.3	0.3	0.1				
MEAN	0.160	0.375	0.616	0.861	1.115	1.355	1.612	1.852	2.346	3.542	6.111				
ST. DEV	0.060	0.070	0.072	0.073	0.069	0.070	0.071	0.075	0.274	0.402	0.673				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - MINUTE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 16 TO 16 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	1	4	2	11	2	8	2	0	7	2	0	39	0.9	17.432	6.575
9.0	10.0	0	2	2	2	0	1	0	0	0	1	0	8	0.2	9.538	0.298
8.0	9.0	0	1	0	2	1	2	1	0	1	0	1	9	0.2	8.548	0.320
7.0	8.0	2	0	6	3	7	6	1	2	1	1	0	29	0.7	7.496	0.278
6.0	7.0	1	4	5	11	12	2	2	1	4	4	0	46	1.1	6.438	0.257
5.0	6.0	0	3	17	19	13	6	10	5	7	3	0	83	1.9	5.487	0.308
4.0	5.0	1	6	26	25	19	17	13	5	20	1	0	133	3.0	4.441	0.281
3.0	4.0	1	12	47	57	56	41	25	15	23	1	0	278	6.4	3.451	0.299
2.0	3.0	4	48	109	152	94	75	37	14	15	1	2	551	12.6	2.451	0.289
1.0	2.0	23	286	415	274	125	35	19	4	11	2	2	1196	27.4	1.444	0.285
0.5	1.0	96	434	243	89	37	15	4	3	2	3	1	927	21.2	0.746	0.145
0.0	0.5	402	389	163	59	31	10	5	3	3	2	1	1068	24.5	0.255	0.140
TOTAL		531	1189	1035	704	397	218	119	52	94	21	7	4367			
PERCENT		12.2	27.2	23.7	16.1	9.1	5.0	2.7	1.2	2.2	0.5	0.2				
MEAN		0.164	0.377	0.616	0.866	1.116	1.361	1.601	1.866	2.353	3.738	6.578				
ST. DEV		0.059	0.069	0.072	0.070	0.076	0.072	0.065	0.079	0.290	0.585	1.057				

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JIMSPHERE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 0 TO 2 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	37	26	11	6	0	1	0	1	0	0	0	82	3.5	21.882	18.306
9.0	10.0	6	3	3	1	0	0	0	0	0	0	0	13	0.6	9.472	0.316
8.0	9.0	10	7	1	1	0	0	1	0	0	0	0	20	0.9	8.409	0.285
7.0	8.0	10	15	3	2	1	1	1	0	0	0	0	33	1.4	7.541	0.314
6.0	7.0	24	15	7	1	0	1	0	0	0	0	0	48	2.1	6.515	0.247
5.0	6.0	24	19	19	6	1	0	0	0	0	0	0	70	3.0	5.545	0.290
4.0	5.0	54	37	10	9	1	2	0	0	0	0	0	113	4.8	4.495	0.281
3.0	4.0	104	47	13	3	3	1	1	1	0	0	1	174	7.5	3.441	0.286
2.0	3.0	173	91	28	6	4	4	0	1	1	0	0	306	13.2	2.471	0.296
1.0	2.0	361	158	35	8	1	1	0	1	1	1	0	567	24.3	1.455	0.292
0.5	1.0	310	60	16	2	1	0	1	0	0	0	0	390	16.7	0.750	0.147
0.0	0.5	411	86	12	4	3	1	0	0	0	0	0	517	22.1	0.233	0.145
TOTAL		1524	564	158	49	15	12	4	4	3	1	1	2335			
PERCENT		65.3	24.2	6.8	2.1	0.6	0.5	0.2	0.2	0.1	0.0	0.0				
MEAN		0.111	0.350	0.593	0.850	1.113	1.352	1.563	1.832	2.426	3.121	6.659				
ST. DEV		0.070	0.067	0.066	0.076	0.067	0.074	0.050	0.061	0.408	0.000	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 2 TO 4 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	92	58	16	4	3	1	0	2	1	1	4	182	4.6	19.261	14.616
9.0	10.0	27	6	3	4	1	0	1	0	0	0	0	42	1.1	9.477	0.308
8.0	9.0	28	10	5	1	0	1	0	1	0	0	0	46	1.1	8.451	0.315
7.0	8.0	35	11	2	3	0	0	0	0	0	0	0	51	1.3	7.455	0.268
6.0	7.0	50	20	11	3	1	2	0	0	0	0	0	87	2.2	6.470	0.311
5.0	6.0	63	28	11	3	3	2	1	0	0	0	0	111	2.8	5.461	0.308
4.0	5.0	90	44	19	4	0	0	1	0	1	0	0	159	4.0	4.431	0.289
3.0	4.0	176	64	34	8	1	3	1	0	0	0	0	287	7.2	3.454	0.292
2.0	3.0	301	143	40	11	2	1	0	0	0	0	0	498	12.4	2.439	0.284
1.0	2.0	598	242	69	16	2	1	1	0	0	0	0	929	23.2	1.447	0.288
0.5	1.0	491	172	45	5	2	0	0	2	0	0	0	717	17.9	0.741	0.144
0.0	0.5	717	132	31	7	1	2	0	0	1	0	0	891	22.3	0.247	0.147
TOTAL		2668	930	286	69	16	13	5	5	3	1	4	4000			
PERCENT		66.7	23.3	7.2	1.7	0.4	0.3	0.1	0.1	0.1	0.0	0.1				
MEAN		0.110	0.348	0.599	0.840	1.116	1.370	1.572	1.803	2.406	3.487	6.870				
ST. DEV		0.069	0.069	0.070	0.072	0.065	0.081	0.051	0.022	0.294	0.000	1.109				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 4 TO 6 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	23	14	7	2	4	1	0	0	0	0	0	51	1.1	27.541	25.558
9.0	10.0	7	3	1	0	0	0	0	1	0	0	0	12	0.3	9.576	0.281
8.0	9.0	9	5	4	1	0	0	0	0	0	0	0	19	0.4	8.454	0.233
7.0	8.0	13	10	6	1	0	0	0	0	0	0	0	30	0.7	7.393	0.267
6.0	7.0	23	13	7	3	1	0	0	0	0	0	0	47	1.0	6.476	0.294
5.0	6.0	35	32	6	3	1	0	0	0	0	0	0	77	1.7	5.423	0.308
4.0	5.0	61	45	14	1	0	0	0	0	0	0	0	121	2.7	4.434	0.309
3.0	4.0	142	71	29	3	3	1	0	0	0	0	0	249	5.5	3.434	0.2[illegible]
2.0	3.0	269	128	36	17	3	0	0	0	0	0	0	453	10.1	2.409	0.290
1.0	2.0	652	274	74	21	6	3	0	0	1	0	0	1031	22.9	1.421	0.282
0.5	1.0	636	270	48	5	5	1	0	1	0	0	0	966	21.5	0.727	0.143
0.0	0.5	1129	239	51	11	2	1	0	1	3	0	0	1437	32.0	0.239	0.143
TOTAL		2999	1104	283	68	25	7	0	3	4	0	0	4493			
PERCENT		66.7	24.6	6.3	1.5	0.6	0.2	0.0	0.1	0.1	0.0	0.0				
MEAN		0.109	0.349	0.592	0.851	1.109	1.310	0.000	1.844	2.160	0.000	0.000				
ST. DEV		0.070	0.068	0.069	0.071	0.072	0.064	0.000	0.020	0.106	0.000	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 6 TO 8 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	27	14	6	1	0	0	0	0	0	0	0	48	1.0	23.186	25.141
9.0	10.0	4	3	0	0	0	0	0	0	0	0	0	7	0.1	9.460	0.364
8.0	9.0	6	5	0	0	1	0	0	0	0	0	0	12	0.3	8.493	0.302
7.0	8.0	15	4	2	0	0	0	0	0	0	0	0	21	0.4	7.500	0.304
6.0	7.0	19	8	1	0	0	0	0	0	0	0	0	28	0.6	6.453	0.259
5.0	6.0	20	7	0	0	0	0	0	0	0	0	0	27	0.6	5.451	0.268
4.0	5.0	52	16	5	3	0	1	0	0	2	0	0	79	1.7	4.448	0.290
3.0	4.0	76	32	15	8	3	1	0	0	0	0	0	135	2.9	3.397	0.297
2.0	3.0	229	95	30	16	6	1	0	0	0	0	0	377	8.0	2.438	0.282
1.0	2.0	648	275	93	36	6	4	1	0	0	0	0	1065	22.6	1.405	0.274
0.5	1.0	775	293	83	16	2	2	1	0	0	0	0	1172	24.8	0.729	0.143
0.0	0.5	1355	328	45	17	0	1	1	1	1	0	0	1749	37.1	0.236	0.143
TOTAL		3226	1080	282	97	18	10	3	1	3	0	0	4720			
PERCENT		68.3	22.9	6.0	2.1	0.4	0.2	0.1	0.0	0.1	0.0	0.0				
MEAN		0.108	0.342	0.605	0.844	1.115	1.339	1.621	1.985	2.112	0.000	0.000				
ST. DEV		0.069	0.068	0.071	0.064	0.080	0.059	0.110	0.000	0.097	0.000	0.000				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 8 TO 10 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	10	8	0	0	1	0	0	0	0	0	0	19	0.4	14.444	4.933
9.0	10.0	2	6	0	0	0	0	0	0	0	0	0	8	0.2	9.518	0.314
8.0	9.0	4	2	1	0	0	0	0	0	0	0	0	7	0.1	8.426	0.238
7.0	8.0	4	2	0	0	0	0	0	0	0	0	0	6	0.1	7.408	0.239
6.0	7.0	6	4	1	1	0	0	0	0	0	0	0	12	0.3	6.435	0.295
5.0	6.0	13	4	1	0	0	0	0	0	0	0	0	18	0.4	5.425	0.290
4.0	5.0	18	6	1	0	1	0	0	2	1	0	0	29	0.6	4.481	0.287
3.0	4.0	30	11	4	1	2	1	2	1	1	1	0	54	1.1	3.382	0.280
2.0	3.0	79	62	28	9	7	6	4	0	0	1	0	196	4.2	2.363	0.266
1.0	2.0	436	272	150	51	23	6	0	1	2	0	0	941	19.9	1.369	0.271
0.5	1.0	752	387	133	19	2	2	0	1	1	0	0	1297	27.5	0.722	0.144
0.0	0.5	1634	411	70	7	5	3	0	2	1	0	0	2133	45.2	0.235	0.143
TOTAL		2988	1175	389	88	41	18	6	7	6	2	0	4720			
PERCENT		63.3	24.9	8.2	1.9	0.9	0.4	0.1	0.1	0.1	0.0	0.0				
MEAN		0.112	0.3[illegible]	0.607	0.858	1.097	1.360	1.607	1.882	2.404	3.292	0.000				
ST. DEV		0.070	0.069	0.071	0.077	0.076	0.070	0.049	0.078	0.311	0.180	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 10 TO 12 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	3	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
9.0	10.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
8.0	9.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
7.0	8.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
6.0	7.0	0	1	0	0	0	0	0	0	0	0	0	1	0.0	6.153	0.000
5.0	6.0	0	1	2	0	0	0	0	0	0	0	0	7	0.2	5.355	0.184
4.0	5.0	9	5	3	2	4	5	1	0	2	1	0	32	0.7	4.376	0.232
3.0	4.0	14	19	11	13	8	8	2	3	9	0	0	87	1.9	3.403	0.268
2.0	3.0	82	57	45	21	14	16	17	5	2	0	0	259	5.7	2.415	0.285
1.0	2.0	373	306	163	95	64	30	8	4	2	0	0	1045	23.0	1.395	0.278
0.5	1.0	618	399	189	56	9	3	0	0	2	2	0	1278	28.1	0.730	0.143
0.0	0.5	1288	407	99	19	10	1	1	1	8	1	0	1835	40.4	0.249	0.142
TOTAL		2384	1195	512	206	109	63	31	14	26	4	0	4544			
PERCENT		52.5	26.3	11.3	4.5	2.4	1.4	0.7	0.3	0.6	0.1	0.0				
MEAN		.116	0.356	0.607	0.851	1.111	1.366	1.623	1.879	2.377	3.409	0.000				
ST. DEV		0.070	0.071	0.073	0.068	0.072	0.076	0.068	0.063	0.303	0.227	0.000				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 12 TO 14 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	0	0	0	0	0	0	0	0	0	0	1	1	0.0	11.597	0.000
9.0	10.0	0	0	0	0	0	0	0	0	1	0	2	3	0.1	9.371	0.294
8.0	9.0	0	0	0	0	0	0	0	0	0	4	0	4	0.1	8.416	0.119
7.0	8.0	0	1	0	0	0	0	0	0	3	2	0	6	0.1	7.550	0.282
6.0	7.0	0	0	0	0	1	0	0	0	1	2	0	4	0.1	6.395	0.202
5.0	6.0	0	1	0	0	1	1	1	0	2	6	0	12	0.3	5.439	0.301
4.0	5.0	7	2	7	3	2	2	2	0	12	3	1	41	1.0	4.446	0.284
3.0	4.0	26	24	16	13	9	11	4	7	17	6	0	133	3.2	3.442	0.263
2.0	3.0	89	67	66	45	29	23	21	16	22	6	1	376	8.9	2.433	0.270
1.0	2.0	273	245	193	175	80	51	22	5	2	3	0	1049	24.9	1.451	0.278
0.5	1.0	382	323	218	74	27	5	1	0	2	4	1	1037	24.6	0.738	0.145
0.0	0.5	1023	385	99	23	8	5	1	1	5	3	0	1553	36.8	0.243	0.144
TOTAL		1791	1048	599	333	157	98	52	29	67	39	6	4219			
PERCENT		42.5	24.8	14.2	7.9	3.7	2.3	1.2	0.7	1.6	0.9	0.1				
MEAN		0.116	0.365	0.618	0.870	1.106	1.371	1.617	1.852	2.421	3.651	5.835				
ST. DEV		0.071	0.072	0.073	0.071	0.073	0.072	0.076	0.066	0.309	0.515	0.210				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 14 TO 16 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	0	0	2	0	0	0	0	0	0	0	2	4	0.2	13.397	4.293
9.0	10.0	0	1	0	0	0	0	0	0	0	0	1	2	0.1	9.360	0.481
8.0	9.0	0	0	0	0	0	0	0	0	0	3	0	3	0.1	8.158	0.161
7.0	8.0	1	1	2	0	2	0	0	0	3	2	0	11	0.4	7.538	0.274
6.0	7.0	4	1	0	0	1	0	0	0	3	3	0	12	0.5	6.434	0.297
5.0	6.0	3	5	4	6	3	2	1	2	6	1	0	33	1.3	5.422	0.305
4.0	5.0	8	11	8	9	5	9	1	1	9	0	0	61	2.3	4.418	0.280
3.0	4.0	35	27	18	17	14	13	12	9	9	0	0	154	5.8	3.468	0.297
2.0	3.0	77	87	57	42	24	20	13	13	9	1	0	343	13.0	2.426	0.282
1.0	2.0	175	206	132	76	42	20	5	2	1	1	0	663	25.0	1.440	0.286
0.5	1.0	231	215	95	26	8	3	1	1	0	0	0	580	22.0	0.732	0.146
0.0	0.5	483	189	61	27	7	0	4	1	1	0	0	773	29.3	0.243	0.144
TOTAL		1017	743	379	203	106	67	37	29	41	11	3	2636			
PERCENT		38.6	28.2	14.4	7.7	4.0	2.5	1.4	1.1	1.6	0.4	0.1				
MEAN		0.121	0.364	0.613	0.864	1.107	1.383	1.601	1.869	2.408	3.911	6.579				
ST. DEV		0.072	0.073	0.071	0.073	0.071	0.071	0.061	0.083	0.307	0.647	0.338				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 16 TO 18 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	1	2	2	1	1	3	0	0	0	2	0	12	1.6	12.827	3.173
9.0	10.0	2	0	0	0	0	0	0	0	0	0	0	2	0.3	9.861	0.141
8.0	9.0	3	2	0	0	0	0	0	0	0	0	1	6	0.8	8.392	0.230
7.0	8.0	3	1	2	1	0	0	0	1	1	0	0	9	1.2	7.486	0.253
6.0	7.0	1	3	0	2	2	2	0	0	0	2	0	12	1.6	6.595	0.282
5.0	6.0	6	3	4	3	0	0	1	0	0	1	0	18	2.3	5.422	0.273
4.0	5.0	7	7	7	4	2	4	0	1	2	2	0	36	4.7	4.342	0.252
3.0	4.0	13	14	12	8	5	2	0	1	2	1	1	59	7.7	3.395	0.265
2.0	3.0	38	26	23	19	12	8	2	2	3	0	0	133	17.3	2.481	0.283
1.0	2.0	58	58	39	28	12	6	2	0	2	0	0	205	26.7	1.514	0.277
0.5	1.0	50	31	16	5	3	0	2	1	0	0	0	128	16.6	0.733	0.146
0.0	0.5	79	38	15	7	5	0	2	0	1	2	0	149	19.4	0.235	0.148
TOTAL		261	205	120	78	42	25	9	6	11	10	2	769			
PERCENT		33.9	26.7	15.6	10.1	5.5	3.3	1.2	0.8	1.4	1.3	0.3				
MEAN		0.120	0.363	0.613	0.871	1.102	1.340	1.613	1.851	2.192	3.724	5.495				
ST. DEV		0.070	0.065	0.069	0.072	0.071	0.067	0.078	0.061	0.120	0.611	0.302				

JIMSPHERE - PRESSURE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 0 TO 2 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	7	0	3	6	1	3	2	1	1	0	0	24	1.3	56.801	13.600
30.0	40.0	4	1	2	2	1	2	2	2	3	0	0	19	1.0	33.097	2.218
20.0	30.0	18	13	9	4	4	3	3	4	8	0	0	66	3.6	23.565	2.397
15.0	20.0	23	21	2	8	4	6	3	2	1	0	0	70	3.8	17.080	1.471
10.0	15.0	27	24	18	18	11	7	0	3	3	3	0	114	6.2	11.928	1.347
5.0	10.0	83	87	59	44	33	20	14	6	14	3	0	363	19.9	6.990	1.401
4.0	5.0	48	35	22	16	6	2	1	0	0	0	0	130	7.1	4.455	0.285
3.0	4.0	62	61	22	16	7	4	2	0	2	2	1	179	9.8	3.484	0.295
2.0	3.0	97	60	28	14	3	4	2	0	1	0	0	209	11.4	2.538	0.304
1.0	2.0	159	70	38	12	7	2	0	0	0	2	1	291	15.9	1.457	0.280
0.0	1.0	215	93	33	10	5	4	0	1	0	0	0	361	19.8	0.504	0.287
TOTAL		743	465	236	150	82	57	29	19	33	10	2	1826			
PERCENT		40.7	25.5	12.9	8.2	4.5	3.1	1.6	1.0	1.8	0.5	0.1				
MEAN		0.127	0.365	0.610	0.873	1.101	1.366	1.603	1.840	2.282	3.619	6.519				
ST. DEV		0.072	0.072	0.068	0.072	0.065	0.075	0.069	0.066	0.219	0.553	0.054				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 2 TO 4 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	20	19	19	15	5	3	2	1	5	0	0	89	2.4	63.474	25.541
30.0	40.0	13	18	13	4	2	0	1	0	1	0	0	52	1.4	34.290	2.866
20.0	30.0	31	19	31	10	12	3	6	7	7	5	9	145	3.9	23.968	2.523
15.0	20.0	32	18	19	22	10	10	3	2	4	6	4	130	3.5	17.277	1.407
10.0	15.0	74	46	38	39	24	12	5	8	17	10	3	276	7.5	12.115	1.405
5.0	10.0	195	164	102	89	57	43	31	28	35	8	0	753	20.5	7.040	1.415
4.0	5.0	75	62	55	41	25	14	6	6	9	1	0	294	8.0	4.465	0.294
3.0	4.0	109	98	70	40	26	12	7	4	7	0	0	373	10.2	3.505	0.294
2.0	3.0	128	109	63	55	25	14	11	3	9	5	0	421	11.5	2.460	0.287
1.0	2.0	185	141	87	46	16	13	5	7	5	3	0	508	13.8	1.486	0.291
0.0	1.0	339	160	58	29	23	7	7	2	6	2	0	633	17.2	0.494	0.289
TOTAL		1201	853	555	390	225	136	84	68	106	40	16	3674			
PERCENT		32.7	23.2	15.1	10.6	6.1	3.7	2.3	1.9	2.9	1.1	0.4				
MEAN		0.120	0.370	0.612	0.870	1.118	1.362	1.618	1.865	2.398	3.771	6.014				
ST. DEV		0.072	0.074	0.071	0.073	0.073	0.069	0.073	0.071	0.298	0.657	0.884				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

B 6

JIMSPHERE - PRESSURE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 4 TO 6 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	5	1	9	4	4	6	2	0	0	0	0	31	0.7	85.553	36.741
30.0	40.0	3	6	2	3	2	2	3	1	4	0	0	26	0.6	33.595	2.663
20.0	30.0	11	18	12	10	2	6	7	6	19	7	0	98	2.3	23.625	2.625
15.0	20.0	16	16	18	7	8	10	6	9	19	2	0	111	2.6	17.120	1.396
10.0	15.0	41	41	43	40	31	16	14	9	24	8	1	268	6.3	11.879	1.329
5.0	10.0	164	169	118	85	99	47	28	30	64	22	0	826	19.3	7.041	1.385
4.0	5.0	69	58	36	47	24	13	9	5	40	8	0	309	7.2	4.471	0.286
3.0	4.0	103	81	62	34	39	11	16	14	34	5	0	399	9.3	3.490	0.288
2.0	3.0	144	123	67	68	52	33	20	13	15	3	0	538	12.5	2.482	0.290
1.0	2.0	245	182	117	88	50	23	12	3	9	1	0	730	17.0	1.467	0.284
0.0	1.0	481	216	108	61	29	20	13	6	15	3	0	952	22.2	0.486	0.283
TOTAL		1282	911	592	447	340	187	130	96	243	59	1	4288			
PERCENT		29.9	21.2	13.8	10.4	7.9	4.4	3.0	2.2	5.7	1.4	0.0				
MEAN		0.119	0.370	0.615	0.873	1.117	1.369	1.622	1.873	2.409	3.603	5.010				
ST. DEV		0.071	0.071	0.074	0.069	0.072	0.073	0.067	0.075	0.283	0.481	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 6 TO 8 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	4	4	15	12	18	5	9	0	2	0	0	69	1.5	91.536	38.986
30.0	40.0	7	3	8	3	2	0	0	0	1	0	0	24	0.5	34.741	3.160
20.0	30.0	5	5	8	7	5	1	3	2	10	0	0	46	1.0	23.873	2.826
15.0	20.0	15	14	16	9	9	0	7	4	10	3	1	88	1.9	16.794	1.453
10.0	15.0	16	26	29	17	27	21	16	6	41	25	0	224	4.9	12.001	1.340
5.0	10.0	127	115	114	91	58	44	36	29	109	51	5	779	16.9	6.968	1.450
4.0	5.0	62	54	40	23	27	18	19	15	32	5	2	297	6.5	4.484	0.283
3.0	4.0	83	83	84	60	55	30	16	25	28	6	0	470	10.2	3.512	0.288
2.0	3.0	148	124	89	83	47	22	40	28	26	8	3	618	13.4	2.470	0.281
1.0	2.0	234	202	158	104	76	46	28	21	22	7	2	890	19.3	1.464	0.285
0.0	1.0	473	246	141	78	53	37	20	11	27	11	0	1097	23.8	0.472	0.280
TOTAL		1164	876	702	487	377	224	194	141	308	116	13	4602			
PERCENT		25.3	19.0	15.3	10.6	8.2	4.9	4.2	3.1	6.7	2.5	0.3				
MEAN		0.118	0.371	0.617	0.870	1.116	1.373	1.619	1.870	2.412	3.726	5.542				
ST. DEV		0.072	0.071	0.074	0.073	0.071	0.073	0.072	0.071	0.273	0.567	0.516				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - PRESSURE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 8 TO 10 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	8	2	6	4	6	4	4	1	14	2	0	51	1.1	94.812	50.149
30.0	40.0	1	4	4	0	5	0	1	0	1	1	0	17	0.4	34.867	2.554
20.0	30.0	4	8	2	4	3	4	0	0	1	0	0	26	0.6	24.150	2.556
15.0	20.0	10	4	3	10	3	2	0	0	1	0	0	33	0.7	17.422	1.475
10.0	15.0	10	14	16	14	7	1	2	4	9	8	0	85	1.9	11.883	1.448
5.0	10.0	50	70	59	56	46	51	37	35	98	25	0	527	11.5	6.788	1.387
4.0	5.0	46	43	55	44	24	29	30	14	66	5	0	356	7.8	4.453	0.284
3.0	4.0	73	76	64	79	55	51	35	29	58	16	0	536	11.7	3.470	0.287
2.0	3.0	106	125	103	78	65	64	44	35	58	7	0	685	15.0	2.476	0.295
1.0	2.0	183	199	173	134	92	53	28	28	27	6	7	930	20.4	1.484	0.290
0.0	1.0	548	318	215	103	44	28	24	14	18	8	1	1321	28.9	0.482	0.283
TOTAL		1039	863	700	526	350	287	205	160	351	70	6	4567			
PERCENT		22.8	18.9	15.3	11.5	7.7	6.3	4.5	3.5	7.7	1.7	0.2				
MEAN		0.124	0.366	0.619	0.867	1.113	1.369	1.618	1.862	2.397	3.506	5.592				
ST. DEV		0.072	0.072	0.072	0.071	0.071	0.070	0.070	0.067	0.281	0.447	0.565				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 10 TO 12 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
30.0	40.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
20.0	30.0	3	4	2	1	3	2	0	1	2	0	0	18	0.4	22.167	1.486
15.0	20.0	3	1	6	5	8	10	6	10	14	9	11	83	1.9	16.737	1.150
10.0	15.0	14	11	18	20	18	21	23	16	70	70	26	307	7.0	12.330	1.331
5.0	10.0	61	56	43	39	36	42	35	38	193	172	41	756	17.2	7.004	1.342
4.0	5.0	32	26	26	22	23	28	25	23	69	29	2	305	7.0	4.461	0.285
3.0	4.0	35	26	48	44	45	39	46	34	94	25	8	444	10.1	3.481	0.297
2.0	3.0	64	67	70	68	66	62	40	49	101	29	2	618	14.1	2.484	0.286
1.0	2.0	127	117	113	108	99	92	49	35	61	46	7	854	19.5	1.481	0.291
0.0	1.0	266	205	146	98	78	56	42	24	45	36	2	998	22.8	0.491	0.287
TOTAL		605	513	472	405	376	352	286	230	649	416	99	4383			
PERCENT		13.8	11.7	10.8	9.2	8.6	8.0	6.1	5.2	14.8	9.5	2.3				
MEAN		0.120	0.365	0.625	0.870	1.116	1.365	1.627	1.865	2.465	3.654	6.605				
ST. DEV		0.073	0.070	0.072	0.075	0.071	0.070	0.073	0.074	0.279	0.530	1.683				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - PRESSURE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 12 TO 14 KILOMETERS

DIRECTION CHANGE (DEGREES)	SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0 PLUS	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
30.0 40.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
20.0 30.0	0	0	0	0	0	1	0	0	5	0	0	6	0.2	23.761	2.047
15.0 20.0	6	2	2	2	3	1	0	0	9	2	1	28	0.8	16.688	0.931
10.0 15.0	13	10	11	6	10	8	6	11	17	22	16	130	3.5	11.963	1.345
5.0 10.0	33	48	38	35	30	28	29	35	94	82	9	461	12.4	6.806	1.366
4.0 5.0	22	13	18	26	11	20	13	23	60	27	2	235	6.3	4.458	0.260
3.0 4.0	31	28	36	30	30	24	27	27	72	24	0	329	8.8	3.435	0.286
2.0 3.0	60	60	58	69	55	41	40	28	73	21	1	506	13.6	2.469	0.283
1.0 2.0	153	131	138	118	100	68	46	24	56	20	1	855	22.9	1.487	0.292
0.0 1.0	352	254	184	107	96	45	32	24	64	19	0	1177	31.6	0.470	0.289
TOTAL	670	546	485	393	335	236	193	172	450	217	30	3727			
PERCENT	18.0	14.6	13.0	10.5	9.0	6.3	5.2	4.6	12.1	5.8	0.8				
MEAN	0.124	0.368	0.624	0.866	1.123	1.371	1.630	1.881	2.425	3.667	6.085				
ST. DEV	0.075	0.071	0.072	0.070	0.073	0.073	0.074	0.070	0.277	0.563	1.759				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 14 TO 16 KILOMETERS

DIRECTION CHANGE (DEGREES)	SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0 PLUS	0	0	0	0	0	0	0	0	0	0	2	2	0.1	41.533	0.074
30.0 40.0	0	0	0	0	0	0	0	0	0	0	3	3	0.2	34.442	2.829
20.0 30.0	1	1	1	3	0	2	4	1	6	29	7	55	2.8	23.963	2.461
15.0 20.0	7	2	6	2	4	5	4	7	9	16	10	72	3.7	17.228	1.410
10.0 15.0	6	3	7	1	5	3	8	9	30	28	11	111	5.6	12.216	1.495
5.0 10.0	29	30	38	20	31	30	25	25	69	56	5	358	18.2	7.016	1.338
4.0 5.0	9	13	15	18	12	14	4	9	25	12	4	135	6.9	4.476	0.305
3.0 4.0	22	12	12	20	14	12	19	10	38	19	1	179	9.1	3.485	0.320
2.0 3.0	36	25	26	27	26	23	21	9	32	14	1	240	12.2	2.468	0.288
1.0 2.0	61	53	57	31	29	34	14	21	26	7	1	334	17.0	1.473	0.296
0.0 1.0	126	115	73	54	36	19	13	14	19	11	1	481	24.4	0.465	0.289
TOTAL	297	254	235	176	157	142	112	105	254	192	46	1970			
PERCENT	15.1	12.9	11.9	8.9	8.0	7.2	5.7	5.3	12.9	9.7	2.3				
MEAN	0.113	0.370	0.624	0.874	1.116	1.379	1.632	1.861	2.466	3.855	7.173				
ST. DEV	0.074	0.070	0.072	0.074	0.071	0.068	0.076	0.069	0.294	0.531	1.474				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - PRESSURE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 16 TO 18 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
30.0	40.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
20.0	30.0	5	6	3	4	2	3	2	1	4	5	5	40	8.6	22.852	1.999
15.0	20.0	1	1	2	0	6	1	4	1	2	7	3	28	6.0	17.726	1.487
10.0	15.0	2	3	3	2	2	7	4	4	7	8	1	43	9.2	12.854	1.423
5.0	10.0	8	6	6	4	8	7	4	6	17	15	5	86	18.5	7.297	1.441
4.0	5.0	2	1	5	0	2	4	3	3	6	3	0	29	6.2	4.519	0.324
3.0	4.0	1	2	6	5	4	2	5	5	10	2	0	42	9.0	3.445	0.280
2.0	3.0	7	4	7	9	7	6	7	4	4	3	0	58	12.4	2.445	0.286
1.0	2.0	3	5	4	9	6	8	5	4	7	1	0	52	11.2	1.455	0.277
	1.0	25	10	10	13	5	6	6	4	9	0	0	88	18.9	0.423	0.319
TOTAL		54	38	46	46	42	44	40	32	66	44	14	466			
PERCENT		11.6	8.2	9.9	9.9	9.0	9.4	8.6	6.9	14.2	9.4	3.0				
MEAN		0.099	0.375	0.619	0.864	1.130	1.374	1.618	1.897	2.441	3.608	6.268				
ST. DEV		0.082	0.074	0.071	0.071	0.076	0.068	0.079	0.079	0.287	0.527	1.152				

JIMSPHERE - MINUTE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 0 TO 2 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	1	3	1	0	3	4	2	0	0	0	14	0.8	67.478	18.230
30.0	40.0	8	2	1	2	1	1	0	1	0	0	0	16	0.9	36.140	2.796
20.0	30.0	7	2	3	3	2	1	0	0	1	0	0	19	1.0	24.082	2.821
15.0	20.0	13	5	5	8	3	4	1	0	0	1	0	40	2.2	16.923	1.280
10.0	15.0	21	17	21	6	7	6	6	1	2	1	0	88	4.8	11.912	1.312
5.0	10.0	120	79	58	31	20	5	6	5	2	1	0	327	17.9	6.873	1.383
4.0	5.0	42	33	25	6	9	3	0	0	3	3	0	124	6.8	4.493	0.293
3.0	4.0	61	48	22	9	7	1	0	0	1	0	0	149	8.2	3.459	0.271
2.0	3.0	99	67	30	17	9	1	0	2	0	0	0	225	12.3	2.477	0.292
1.0	2.0	200	101	41	23	11	3	1	0	0	1	0	381	20.9	1.478	0.302
0.0	1.0	290	82	41	15	9	2	2	0	1	0	0	442	24.2	0.484	0.289
TOTAL		861	437	250	121	78	30	20	11	10	7	0	1825			
PERCENT		47.2	23.9	13.7	6.6	4.3	1.6	1.1	0.6	0.5	0.4	0.0				
MEAN		0.117	0.362	0.606	0.855	1.097	1.366	1.614	1.872	2.457	3.524	0.000				
ST. DEV		0.069	0.070	0.070	0.068	0.071	0.069	0.071	0.082	0.317	0.361	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 2 TO 4 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	15	9	10	4	1	0	1	0	0	3	0	43	1.2	64.390	34.057
30.0	40.0	15	7	7	10	3	1	0	0	0	0	0	43	1.2	34.730	2.803
20.0	30.0	26	27	14	18	1	3	0	2	2	0	0	93	2.6	23.816	2.843
15.0	20.0	35	21	13	4	7	1	0	2	3	1	0	87	2.4	17.278	1.365
10.0	15.0	51	45	21	18	10	9	3	2	3	0	0	162	4.5	12.181	1.362
5.0	10.0	190	129	106	59	31	10	2	1	1	0	0	529	14.8	6.987	1.413
4.0	5.0	89	81	39	12	10	6	0	0	1	0	0	238	6.6	4.451	0.291
3.0	4.0	119	87	63	26	10	8	5	1	1	0	0	320	8.9	3.444	0.280
2.0	3.0	184	140	66	26	19	5	5	1	1	0	0	447	12.5	2.471	0.282
1.0	2.0	313	200	83	38	13	3	2	1	1	0	0	654	18.3	1.462	0.294
0.0	1.0	655	205	64	27	9	5	1	0	0	0	0	966	27.0	0.467	0.283
TOTAL		1692	951	486	242	114	51	19	10	13	4	0	3582			
PERCENT		47.2	26.5	13.6	6.8	3.2	1.4	0.5	0.3	0.4	0.1	0.0				
MEAN		0.117	0.361	0.607	0.870	1.107	1.353	1.628	1.850	2.239	3.589	0.000				
ST. DEV		0.071	0.071	0.072	0.071	0.070	0.070	0.080	0.068	0.211	0.425	0.000				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - MINUTE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 4 TO 6 KILOMETERS

DIRECTION CHANGE (DEGREES)	SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0 PLUS	6	4	3	3	1	0	0	1	0	0	0	18	0.4	77.952	38.513
30.0 40.0	3	1	1	0	0	0	0	0	0	0	0	5	0.1	32.526	2.528
20.0 30.0	4	3	5	1	2	0	0	0	0	0	0	15	0.4	24.609	2.790
15.0 20.0	12	7	1	4	2	0	0	0	0	0	0	26	0.6	16.711	1.456
10.0 15.0	37	25	12	6	6	2	1	0	0	0	0	89	2.2	11.810	1.320
5.0 10.0	126	97	68	40	14	4	4	0	2	0	0	355	8.9	6.731	1.296
4.0 5.0	85	45	33	13	13	4	1	0	0	0	0	194	4.8	4.463	0.294
3.0 4.0	113	110	47	25	14	6	1	1	0	0	0	317	7.9	3.452	9.280
2.0 3.0	231	138	66	37	8	6	3	3	1	0	0	493	12.3	2.464	0.282
1.0 2.0	456	270	137	70	8	3	5	2	1	0	0	952	23.7	1.456	0.284
0.0 1.0	958	411	104	46	16	5	3	2	1	0	0	1546	38.6	0.482	0.278
TOTAL	2031	1111	477	245	84	30	24	9	5	0	0	4010			
PERCENT	50.6	27.7	11.9	6.1	2.1	0.7	0.4	0.2	0.1	0.0	0.0				
MEAN	0.116	0.359	0.610	0.850	1.107	1.341	1.612	1.890	2.221	0.000	0.000				
ST. DEV	0.071	0.072	0.070	0.070	0.070	0.063	0.059	0.052	0.082	0.000	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 6 TO 8 KILOMETERS

DIRECTION CHANGE (DEGREES)	SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0 PLUS	5	1	1	0	1	1	1	1	0	0	0	11	0.2	86.721	47.850
30.0 40.0	0	0	2	2	1	1	2	0	0	0	0	8	0.2	34.893	2.411
20.0 30.0	7	11	14	7	5	5	1	0	0	0	0	50	1.1	24.130	2.848
15.0 20.0	4	11	8	6	4	1	2	0	0	0	0	36	0.8	17.660	1.300
10.0 15.0	20	16	15	5	6	6	4	2	4	0	0	78	1.8	11.936	1.330
5.0 10.0	111	90	70	49	43	25	12	19	23	0	0	442	10.0	6.619	1.298
4.0 5.0	75	58	53	23	16	14	7	6	10	0	0	262	5.9	4.479	0.285
3.0 4.0	130	111	62	48	21	20	15	11	17	0	0	435	9.8	3.464	0.291
2.0 3.0	212	175	103	73	43	26	15	19	8	0	0	674	15.2	2.473	0.288
1.0 2.0	366	255	154	97	53	27	13	5	4	0	0	974	22.0	1.464	0.282
0.0 1.0	784	385	199	74	35	22	11	4	9	2	0	1455	32.9	0.471	0.286
TOTAL	1694	1113	631	384	228	148	83	67	75	2	0	4425			
PERCENT	38.3	25.2	14.3	8.7	5.2	3.3	1.9	1.5	1.7	0.0	0.0				
MEAN	0.120	0.364	0.612	0.866	1.111	1.358	1.624	1.861	2.330	3.192	0.000				
ST. DEV	0.071	0.071	0.072	0.071	0.076	0.067	0.074	0.068	0.241	0.173	0.000				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - MINUTE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 8 TO 10 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	3	3	1	2	1	2	1	0	0	0	0	13	0.3	49.414	7.068
30.0	40.0	2	0	1	1	0	2	4	0	0	0	0	10	0.2	34.618	2.185
20.0	30.0	4	0	3	3	4	3	0	0	0	0	0	17	0.4	23.694	3.237
15.0	20.0	3	4	1	3	2	1	2	0	0	0	0	16	0.4	17.182	1.511
10.0	15.0	10	13	5	6	3	1	0	2	0	0	0	40	0.9	11.871	1.479
5.0	10.0	72	64	41	36	19	19	5	7	17	7	0	287	6.4	6.643	1.226
4.0	5.0	37	31	27	21	16	10	13	14	12	0	0	181	4.0	4.410	0.266
3.0	4.0	67	55	59	36	22	25	18	15	10	0	0	307	6.8	3.438	0.293
2.0	3.0	146	131	117	88	55	40	30	9	11	0	0	627	14.0	2.446	0.283
1.0	2.0	304	271	211	149	86	36	18	12	5	0	0	1092	24.4	1.458	0.280
0.0	1.0	977	494	247	93	39	15	11	10	7	1	0	1894	42.2	0.456	0.283
TOTAL		1625	1066	713	438	247	154	102	69	62	8	0	4484			
PERCENT		36.2	23.8	15.9	9.8	5.5	3.4	2.3	1.5	1.4	0.2	0.0				
MEAN		0.119	0.365	0.609	0.864	1.105	1.359	1.610	1.853	2.374	3.288	0.000				
ST. DEV		0.072	0.071	0.073	0.072	0.070	0.072	0.072	0.072	0.285	0.207	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 10 TO 12 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0	PLUS	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
30.0	40.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
20.0	30.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
15.0	20.0	3	3	0	0	0	0	0	0	0	0	0	6	0.1	17.114	1.297
10.0	15.0	2	5	1	4	1	1	0	8	8	1	0	31	0.7	11.756	1.316
5.0	10.0	55	55	33	28	39	34	34	36	47	16	0	377	8.8	6.697	1.242
4.0	5.0	35	25	18	22	21	20	14	6	17	16	0	194	4.5	4.474	0.268
3.0	4.0	49	43	39	37	24	25	17	14	19	5	0	272	6.4	3.465	0.301
2.0	3.0	113	101	89	81	68	41	27	15	23	5	0	563	13.1	2.435	0.276
1.0	2.0	271	228	192	143	118	52	36	20	21	2	0	1083	25.3	1.447	0.283
0.0	1.0	688	500	268	143	69	35	22	13	11	7	1	1757	41.0	0.486	0.283
TOTAL		1216	960	640	458	340	208	150	112	146	52	1	4283			
PERCENT		28.4	22.4	14.9	10.7	7.9	4.9	3.5	2.6	3.4	1.2	0.0				
MEAN		0.121	0.364	0.618	0.870	1.114	1.373	1.623	1.867	2.417	3.414	6.466				
ST. DEV		0.071	0.071	0.072	0.074	0.074	0.073	0.074	0.070	0.279	0.359	0.000				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - MINUTE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 12 TO 14 KILOMETERS

DIRECTION CHANGE (DEGREES)	SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0 PLUS	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
30.0 40.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
20.0 30.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
15.0 20.0	0	1	1	0	0	0	0	1	4	3	1	11	0.3	16.623	1.334
10.0 15.0	3	4	5	2	5	2	6	5	8	2	3	45	1.2	11.876	1.337
5.0 10.0	20	22	22	28	20	27	11	18	57	29	4	258	6.7	6.861	1.326
4.0 5.0	10	13	9	12	7	10	9	6	39	12	2	129	3.3	4.465	0.300
3.0 4.0	35	32	29	25	18	25	17	22	24	7	1	236	6.1	3.455	0.281
2.0 3.0	80	69	86	66	65	50	46	27	35	8	0	532	13.8	2.466	0.296
1.0 2.0	193	195	182	134	99	73	40	17	29	7	1	970	25.1	1.459	0.290
0.0 1.0	689	472	243	111	72	49	19	12	13	2	0	1682	43.5	0.471	0.283
TOTAL	1030	808	577	379	286	236	148	108	209	70	12	3863			
PERCENT	26.7	20.9	14.9	9.8	7.4	6.1	3.8	2.8	5.4	1.8	0.3				
MEAN	0.120	0.371	0.618	0.867	1.117	1.370	1.615	1.860	2.377	3.598	7.263				
ST. DEV	0.072	0.072	0.071	0.075	0.072	0.073	0.069	0.070	0.275	0.552	2.288				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 14 TO 16 KILOMETERS

DIRECTION CHANGE (DEGREES)	SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0 PLUS	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
30.0 40.0	0	1	0	1	0	0	1	0	5	0	0	8	0.3	34.786	1.074
20.0 30.0	6	1	0	0	1	1	2	1	2	3	3	20	0.8	23.827	3.218
15.0 20.0	4	0	0	2	2	4	2	6	2	2	0	24	1.0	16.921	1.376
10.0 15.0	3	5	7	7	4	4	6	6	19	8	4	73	3.1	12.183	1.480
5.0 10.0	30	31	34	30	20	25	21	20	59	39	4	314	13.3	6.810	1.379
4.0 5.0	19	18	26	14	17	12	11	16	35	13	0	181	7.6	4.457	0.295
3.0 4.0	30	24	26	20	26	24	18	15	36	11	0	230	9.7	3.460	0.272
2.0 3.0	40	50	58	45	48	27	21	21	40	5	0	355	15.0	2.491	0.293
1.0 2.0	71	102	91	84	47	33	19	17	33	6	0	503	21.2	1.466	0.293
0.0 1.0	213	154	98	57	42	31	19	17	26	4	0	661	27.9	0.487	0.281
TOTAL	416	386	340	260	207	162	120	119	257	91	11	2369			
PERCENT	17.6	16.3	14.4	11.0	8.7	6.8	5.1	5.0	10.8	3.8	0.5				
MEAN	0.123	0.369	0.623	0.870	1.120	1.377	1.636	1.865	2.414	3.689	5.627				
ST. DEV	0.074	0.071	0.072	0.074	0.074	0.072	0.069	0.072	0.286	0.537	0.634				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - MINUTE

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 16 TO 18 KILOMETERS

DIRECTION CHANGE (DEGREES)	SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
40.0 PLUS	1	0	1	0	0	0	0	0	1	0	0	3	0.6	42.334	1.884
30.0 40.0	0	1	1	0	0	1	0	0	0	2	0	5	0.9	33.967	2.970
20.0 30.0	2	1	3	3	3	3	3	2	0	3	0	23	4.3	23.133	1.645
15.0 20.0	0	1	1	0	2	4	0	1	1	3	3	16	3.0	17.592	1.821
10.0 15.0	2	2	3	3	5	1	4	0	4	3	0	27	5.0	11.516	1.425
5.0 10.0	14	11	11	12	7	7	4	5	30	10	0	111	20.6	7.098	1.485
4.0 5.0	10	7	9	2	2	2	2	3	5	5	0	47	8.7	4.504	0.285
3.0 4.0	4	7	3	5	6	2	5	2	3	3	0	40	7.4	3.462	0.308
2.0 3.0	16	16	10	9	10	4	5	2	8	2	0	82	15.2	2.439	0.293
1.0 2.0	25	14	13	6	3	8	4	3	2	2	0	80	14.9	1.465	0.298
0.0 1.0	35	18	12	10	5	5	8	3	5	3	0	104	19.3	0.490	0.314
TOTAL	109	78	67	50	43	37	35	21	59	36	3	538			
PERCENT	20.3	14.5	12.5	9.3	8.0	6.9	6.5	3.9	11.0	6.7	0.6				
MEAN	0.113	0.374	0.624	0.882	1.122	1.384	1.616	1.850	2.387	3.560	5.339				
ST. DEV	0.078	0.070	0.072	0.078	0.083	0.070	0.066	0.073	0.300	0.473	0.064				

JIMSPHERE SHEAR - PRESSURE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 0 TO 2 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	29	14	1	2	0	1	0	0	0	0	0	47	2.5	21.970	17.349
9.0	10.0	3	4	0	0	0	0	0	0	0	0	0	7	0.4	9.647	0.264
8.0	9.0	9	2	1	1	0	0	0	0	0	0	0	13	0.7	8.473	0.315
7.0	8.0	9	6	1	1	0	0	0	0	0	0	0	17	0.9	7.483	0.366
6.0	7.0	20	6	3	0	0	0	0	0	0	0	0	29	1.5	6.512	0.290
5.0	6.0	25	20	7	0	0	0	0	1	0	0	0	53	2.8	5.447	0.298
4.0	5.0	47	24	7	3	1	0	1	0	0	0	0	83	4.4	4.481	0.290
3.0	4.0	71	38	4	3	0	1	0	0	0	1	1	119	6.3	3.435	0.289
2.0	3.0	159	62	12	4	0	0	0	0	0	0	0	237	12.5	2.429	0.287
1.0	2.0	322	98	21	4	0	0	0	0	0	1	0	446	23.6	1.452	0.287
0.5	1.0	310	46	4	2	1	0	1	0	2	0	0	366	19.4	0.734	0.145
0.0	0.5	387	73	7	3	3	0	0	0	0	0	0	473	25.0	0.231	0.142
TOTAL		1391	393	68	23	5	2	2	1	2	2	1	1890			
PERCENT		73.6	20.8	3.6	1.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1				
MEAN		0.112	0.349	0.598	0.861	1.094	1.353	1.692	1.916	2.211	3.387	6.557				
ST. DEV		0.070	0.069	0.071	0.066	0.065	0.089	0.044	0.000	0.256	0.491	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 2 TO 4 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	110	33	9	4	2	2	1	0	1	1	2	165	4.3	18.911	13.516
9.0	10.0	23	8	2	2	1	1	0	0	0	0	0	37	1.0	9.445	0.296
8.0	9.0	39	10	3	3	0	1	0	0	0	0	0	56	1.5	8.456	0.323
7.0	8.0	36	8	5	3	0	0	1	0	0	0	0	53	1.4	7.448	0.309
6.0	7.0	34	11	4	1	0	1	0	0	0	0	0	51	1.3	6.445	0.277
5.0	6.0	67	29	9	3	1	0	0	0	0	0	0	109	2.8	5.517	0.257
4.0	5.0	92	39	12	4	0	0	0	0	1	0	0	148	3.8	4.439	0.282
3.0	4.0	163	67	21	8	2	0	0	0	0	0	0	261	6.8	3.449	0.263
2.0	3.0	267	111	29	3	2	1	0	0	0	0	0	413	10.7	2.449	0.287
1.0	2.0	566	218	49	8	0	1	0	0	0	0	0	842	21.8	1.452	0.295
0.5	1.0	553	149	26	5	1	0	0	0	0	0	0	734	19.0	0.732	0.144
0.0	0.5	817	136	25	6	3	0	0	1	1	0	0	989	25.6	0.240	0.150
TOTAL		2767	819	194	50	12	7	2	1	3	1	2	3858			
PERCENT		71.7	21.2	5.0	1.3	0.3	0.2	0.1	0.0	0.1	0.0	0.1				
MEAN		0.107	0.344	0.599	0.846	1.100	1.331	1.647	1.995	2.238	3.217	7.353				
ST. DEV		0.069	0.067	0.069	0.059	0.058	0.061	0.077	0.000	0.361	0.000	0.101				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE SHEAR - PRESSURE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 4 TO 6 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	20	12	5	2	4	1	0	1	0	0	-	45	1.0	30.062	26.437
9.0	10.0	9	6	3	0	0	0	0	0	0	0	0	18	0.4	9.564	0.276
8.0	9.0	8	7	2	1	0	0	0	0	0	0	0	18	0.4	8.439	0.283
7.0	8.0	14	10	2	1	0	0	0	0	0	0	0	27	0.6	7.448	0.266
6.0	7.0	22	13	3	1	0	0	0	0	0	0	0	39	0.9	6.468	0.288
5.0	6.0	35	26	5	1	1	0	0	0	0	0	0	68	1.5	5.427	0.293
4.0	5.0	73	43	12	4	1	0	0	0	0	0	0	133	3.0	4.442	0.297
3.0	4.0	133	55	12	5	1	1	0	0	0	0	0	207	4.6	3.445	0.297
2.0	3.0	266	137	26	10	2	0	0	0	0	0	0	441	9.9	2.455	0.282
1.0	2.0	649	247	61	9	3	2	1	1	0	0	0	973	21.8	1.431	0.279
0.5	1.0	710	257	37	7	3	1	0	1	0	0	0	1016	22.8	0.726	0.142
0.0	0.5	1222	203	31	5	4	0	0	2	2	0	0	1469	33.0	0.242	0.142
TOTAL		3161	1016	199	46	19	5	1	5	2	0	0	4454			
PERCENT		71.0	22.8	4.5	1.0	0.4	0.1	0.0	0.1	0.0	0.0	0.0				
MEAN		0.108	0.347	0.593	0.859	1.105	1.371	1.566	1.883	2.448	0.000	0.000				
ST. DEV		0.070	0.068	0.068	0.075	0.074	0.080	0.000	0.062	0.079	0.000	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 6 TO 8 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	54	14	1	1	0	0	0	0	0	0	0	70	1.5	22.201	21.671
9.0	10.0	7	2	0	0	0	0	0	0	0	0	0	9	0.2	9.644	0.267
8.0	9.0	11	1	0	0	0	0	0	0	0	0	0	12	0.3	8.442	0.295
7.0	8.0	14	5	0	0	1	0	0	0	0	0	0	20	0.4	7.510	0.294
6.0	7.0	14	5	1	0	0	0	0	0	0	0	0	20	0.4	6.627	0.278
5.0	6.0	27	4	0	0	0	0	0	0	0	0	0	31	0.7	5.441	0.285
4.0	5.0	39	16	6	0	2	1	0	1	1	0	0	66	1.5	4.467	0.296
3.0	4.0	71	26	10	9	2	1	0	0	0	0	0	119	2.5	3.440	0.275
2.0	3.0	228	81	32	11	6	2	0	0	0	0	0	360	7.6	2.451	0.286
1.0	2.0	660	255	84	32	4	1	0	0	0	0	0	1036	21.9	1.408	0.279
0.5	1.0	803	310	59	10	3	1	1	0	0	0	0	1187	25.1	0.722	0.142
0.0	0.5	1479	262	39	5	1	1	1	1	1	0	0	1790	37.9	0.239	0.141
TOTAL		3407	981	232	68	19	7	2	2	2	0	0	4720			
PERCENT		72.2	20.8	4.9	1.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0				
MEAN		0.107	0.345	0.602	0.846	1.103	1.391	1.595	1.973	2.066	0.000	0.000				
ST. DEV		0.069	0.068	0.074	0.064	0.048	0.067	0.082	0.029	0.008	0.000	0.000				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JETSPHERE SHEAR - PRESSURE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 8 TO 10 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	21	8	0	1	0	0	0	0	0	0	0	30	0.6	17.450	8.081
9.0	10.0	3	3	1	0	0	0	0	0	0	0	0	7	0.1	9.467	0.295
8.0	9.0	4	0	2	0	0	0	0	0	0	0	0	6	0.1	8.557	0.339
7.0	8.0	5	0	1	0	0	0	0	0	0	0	0	6	0.1	7.663	0.281
6.0	7.0	9	5	0	0	0	0	0	0	0	0	0	14	0.3	6.500	0.308
5.0	6.0	15	7	0	0	0	0	0	0	0	0	0	22	0.5	5.421	0.299
4.0	5.0	9	5	1	0	0	0	1	1	1	0	0	18	0.4	4.495	0.254
3.0	4.0	30	11	4	2	0	2	3	1	0	1	0	54	1.2	3.394	0.275
2.0	3.0	90	47	28	7	7	9	2	1	0	1	0	192	4.1	2.354	0.272
1.0	2.0	469	264	113	50	16	5	0	1	1	0	0	919	19.6	1.353	0.263
0.5	1.0	741	385	110	23	1	0	0	0	3	0	0	1263	27.0	0.724	0.143
0.0	0.5	1688	393	54	7	6	2	0	2	1	0	0	2153	46.0	0.236	0.144
TOTAL		3084	1128	314	90	30	18	6	6	6	2	0	4684			
PERCENT		65.8	24.1	6.7	1.9	0.6	0.4	0.1	0.1	0.1	0.0	0.0				
MEAN		0.109	0.351	0.594	0.845	1.105	1.387	1.675	1.861	2.485	3.201	0.000				
ST. DEV		0.070	0.071	0.066	0.062	0.061	0.067	0.083	0.057	0.268	0.047	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 10 TO 12 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
9.0	10.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
8.0	9.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
7.0	8.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
6.0	7.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
5.0	6.0	0	3	0	0	0	0	2	2	0	0	0	7	0.2	5.464	0.297
4.0	5.0	5	9	1	0	4	5	1	0	1	1	0	27	0.6	4.412	0.249
3.0	4.0	18	14	9	11	6	4	3	6	5	1	0	77	1.7	3.413	0.279
2.0	3.0	67	65	34	26	14	13	13	7	4	0	0	243	5.5	2.399	0.295
1.0	2.0	387	289	159	92	55	24	9	4	2	0	0	1021	23.0	1.397	0.276
0.5	1.0	606	379	193	52	12	3	1	0	4	1	0	1251	28.2	0.722	0.142
0.0	0.5	1311	398	68	18	1	5	2	0	7	2	0	1812	40.8	0.242	0.145
TOTAL		2394	1157	464	199	92	54	31	19	23	5	0	4438			
PERCENT		53.9	26.1	10.5	4.5	2.1	1.2	0.7	0.4	0.5	0.1	0.0				
MEAN		0.116	0.357	0.610	0.865	1.116	1.347	1.606	1.807	2.368	3.404	0.000				
ST. DEV		0.070	0.071	0.072	0.072	0.069	0.065	0.072	0.070	0.317	0.226	0.000				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE SHEAR - PRESSURE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 12 TO 14 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
9.0	10.0	0	0	0	0	0	0	0	0	0	1	2	3	0.1	9.557	0.406
8.0	9.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
7.0	8.0	0	0	1	0	0	0	0	0	0	2	0	3	0.1	7.557	0.144
6.0	7.0	0	0	0	0	1	0	0	0	0	2	0	3	0.1	6.191	0.181
5.0	6.0	0	1	0	1	0	1	1	0	1	3	0	8	0.2	5.312	0.206
4.0	5.0	1	2	5	6	3	1	0	0	6	6	0	30	0.8	4.410	0.280
3.0	4.0	20	16	12	12	10	7	7	3	15	5	0	117	3.1	3.417	0.266
2.0	3.0	77	55	46	44	22	13	27	13	15	4	1	317	8.3	2.414	0.272
1.0	2.0	257	242	175	124	59	38	10	4	3	5	0	917	24.0	1.414	0.280
0.5	1.0	389	317	193	64	18	5	0	0	3	0	0	989	25.8	0.731	0.143
0.0	0.5	984	353	74	10	9	2	0	0	3	3	1	1439	37.6	0.235	0.138
TOTAL		1728	996	506	261	122	67	45	20	46	31	4	3826			
PERCENT		45.2	26.0	13.2	6.8	3.2	1.8	1.2	0.5	1.2	0.8	0.1				
MEAN		0.115	0.362	0.612	0.860	1.115	1.362	1.623	1.866	2.391	3.554	5.841				
ST. DEV		0.071	0.070	0.070	0.071	0.074	0.074	0.067	0.075	0.304	0.514	0.135				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 14 TO 16 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	0	1	0	0	0	0	0	0	0	0	0	1	0.0	12.402	0.000
9.0	10.0	1	0	0	0	0	0	0	0	0	0	1	2	0.1	9.520	0.480
8.0	9.0	0	0	1	0	0	0	0	0	0	1	0	2	0.1	8.576	0.503
7.0	8.0	0	1	1	0	0	0	0	0	1	1	0	4	0.2	7.440	0.300
6.0	7.0	4	0	0	0	1	0	0	0	2	2	0	9	0.4	6.449	0.329
5.0	6.0	6	3	3	3	1	2	1	2	0	1	0	22	1.1	5.410	0.277
4.0	5.0	6	4	10	6	4	4	1	2	6	1	0	44	2.2	4.461	0.305
3.0	4.0	17	20	14	8	13	14	7	9	4	0	0	106	5.2	3.472	0.310
2.0	3.0	65	57	38	27	14	13	12	4	8	0	0	238	11.8	2.410	0.291
1.0	2.0	154	132	112	56	25	17	5	2	0	1	0	504	24.9	1.442	0.294
0.5	1.0	189	185	71	20	2	4	0	0	0	0	0	471	23.3	0.732	0.141
0.0	0.5	401	147	52	14	5	1	0	0	0	1	0	621	30.7	0.242	0.143
TOTAL		843	550	302	134	65	55	26	19	21	8	1	2024			
PERCENT		41.7	27.2	14.9	6.6	3.2	2.7	1.3	0.9	1.0	0.4	0.0				
MEAN		0.124	0.365	0.605	0.864	1.115	1.372	1.619	1.869	2.311	3.743	6.360				
ST. DEV		0.072	0.072	0.070	0.073	0.071	0.068	0.078	0.073	0.301	0.811	0.000				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE SHEAR - PRESSURE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 16 TO 18 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	1	1	1	3	0	0	1	0	0	2	0	9	1.9	13.846	3.234
9.0	10.0	1	0	0	0	0	0	0	0	0	0	0	1	0.2	9.459	0.000
8.0	9.0	2	0	0	1	0	0	0	0	0	0	1	4	0.8	8.397	0.216
7.0	8.0	3	1	0	0	0	0	1	0	0	0	0	5	1.1	7.569	0.291
6.0	7.0	2	2	1	1	1	0	0	1	0	2	0	10	2.1	6.636	0.311
5.0	6.0	4	2	3	1	0	0	0	0	1	0	0	11	2.3	5.501	0.274
4.0	5.0	3	5	3	0	2	1	1	0	2	0	0	17	3.6	4.363	0.243
3.0	4.0	6	4	8	3	4	0	0	1	1	2	0	29	6.2	3.410	0.263
2.0	3.0	18	18	17	7	9	5	4	1	1	1	0	81	17.2	2.477	0.311
1.0	2.0	38	31	29	14	8	2	2	1	1	0	0	126	26.8	1.481	0.295
0.5	1.0	46	20	5	5	2	0	1	0	1	0	0	80	17.0	0.715	0.135
0.0	0.5	49	26	9	6	2	2	1	0	1	2	0	98	20.8	0.234	0.145
TOTAL		173	110	76	41	28	10	11	4	8	9	1	471			
PERCENT		36.7	23.4	16.1	8.7	5.9	2.1	2.3	0.8	1.7	1.9	0.2				
MEAN		0.123	0.366	0.620	0.848	1.104	1.333	1.599	1.893	2.341	4.086	5.654				
ST. DEV		0.067	0.074	0.072	0.079	0.072	0.058	0.090	0.071	0.271	0.532	0.000				

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JIMSPHERE SHEAR - MINUTE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 0 TO 2 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	29	17	3	1	1	0	0	0	0	0	0	51	2.6	20.865	16.356
9.0	10.0	4	2	1	0	0	0	0	0	0	0	0	7	0.4	9.381	0.389
8.0	9.0	5	7	0	0	0	0	0	0	0	0	0	12	0.6	8.528	0.294
7.0	8.0	12	8	0	1	0	0	0	0	0	0	0	21	1.1	7.571	0.294
6.0	7.0	14	9	1	0	0	0	0	0	0	0	0	24	1.2	6.527	0.324
5.0	6.0	27	9	2	3	0	0	0	1	0	0	0	42	2.1	5.404	0.287
4.0	5.0	43	20	8	0	0	0	0	0	0	0	1	72	3.7	4.474	0.310
3.0	4.0	65	36	8	1	1	0	0	0	0	0	0	111	5.7	3.435	0.282
2.0	3.0	169	60	9	3	0	0	0	0	2	0	0	243	12.4	2.448	0.266
1.0	2.0	361	104	25	4	3	0	0	1	0	0	0	498	25.4	1.450	0.288
0.5	1.0	297	59	4	4	2	0	0	0	0	1	0	367	18.7	0.738	0.138
0.0	0.5	422	69	10	5	4	1	0	0	1	0	0	512	26.1	0.243	0.142
TOTAL		1448	400	71	22	11	1	0	2	3	1	1	1960			
PERCENT		73.9	20.4	3.6	1.1	0.6	0.1	0.0	0.1	0.2	0.1	0.1				
MEAN		0.108	0.341	0.613	0.853	1.131	1.280	0.000	1.975	2.502	3.527	7.100				
ST. DEV		0.068	0.068	0.068	0.053	0.078	0.000	0.000	0.001	0.292	0.000	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 2 TO 4 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	99	31	3	5	2	1	1	1	1	0	0	144	3.7	18.535	15.757
9.0	10.0	24	7	4	5	2	0	0	0	0	0	0	42	1.1	9.420	0.247
8.0	9.0	25	5	2	4	0	0	0	0	0	0	0	36	0.9	8.483	0.297
7.0	8.0	30	15	2	0	1	1	0	0	0	0	0	49	1.2	7.555	0.319
6.0	7.0	48	17	6	0	1	0	0	0	0	0	0	72	1.8	6.444	0.287
5.0	6.0	47	21	7	1	0	1	0	0	0	0	0	77	2.0	5.496	0.264
4.0	5.0	97	40	15	3	0	0	0	0	0	0	0	155	4.0	4.417	0.286
3.0	4.0	154	63	21	2	2	0	0	0	1	0	0	243	6.2	3.438	0.284
2.0	3.0	294	116	13	6	0	1	0	0	0	0	0	430	11.0	2.446	0.282
1.0	2.0	621	173	31	7	1	1	1	0	0	0	0	835	21.3	1.421	0.283
0.5	1.0	589	133	21	3	0	0	0	0	0	0	0	746	19.0	0.731	0.145
0.0	0.5	965	106	13	6	2	1	1	0	0	0	0	1094	27.9	0.234	0.143
TOTAL		2993	727	138	42	11	6	3	1	2	0	0	3923			
PERCENT		76.3	18.5	3.5	1.1	0.3	0.2	0.1	0.0	0.1	0.0	0.0				
MEAN		0.101	0.345	0.594	0.850	1.125	1.337	1.644	1.770	2.908	0.000	0.000				
ST. DEV		0.068	0.066	0.067	0.074	0.079	0.078	0.116	0.000	0.068	0.000	0.000				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

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JIMSPHERE SHEAR - MINUTE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 4 TO 6 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	21	8	4	1	5	1	0	0	0	0	0	40	0.9	37.426	35.712
9.0	10.0	2	1	1	0	0	0	1	0	0	0	0	5	0.1	9.409	0.186
8.0	9.0	4	5	0	0	0	0	0	0	0	0	0	9	0.2	8.445	0.302
7.0	8.0	20	3	0	0	0	0	0	0	0	0	0	23	0.5	7.586	0.264
6.0	7.0	20	12	3	0	0	1	0	0	0	0	0	36	0.8	6.420	0.293
5.0	6.0	31	12	3	2	0	0	0	0	0	0	0	48	1.1	5.483	0.295
4.0	5.0	65	23	9	4	1	0	0	0	0	0	0	102	2.3	4.404	0.296
3.0	4.0	122	61	7	5	1	0	0	0	0	0	0	196	4.4	3.472	0.300
2.0	3.0	264	91	23	10	0	0	0	0	0	0	0	388	8.7	2.459	0.288
1.0	2.0	636	225	42	10	1	1	0	0	0	0	0	915	20.5	1.425	0.282
0.5	1.0	778	231	28	5	2	1	1	0	1	0	0	1047	23.5	0.724	0.141
0.0	0.5	1424	180	25	8	3	1	0	2	2	0	0	1645	36.9	0.241	0.146
TOTAL		3387	852	145	45	13	5	2	2	3	0	0	4454			
PERCENT		76.0	19.1	3.3	1.0	0.3	0.1	0.0	0.0	0.1	0.0	0.0				
MEAN		0.103	0.340	0.584	0.845	1.051	1.344	1.629	1.928	2.255	0.000	0.000				
ST. DEV		0.068	0.067	0.068	0.061	0.072	0.061	0.036	0.065	0.170	0.000	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 6 TO 8 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	29	5	2	1	0	0	0	0	0	0	0	37	0.8	28.590	25.789
9.0	10.0	6	2	0	0	0	0	0	0	0	0	0	8	0.2	9.564	0.149
8.0	9.0	8	2	0	0	0	0	0	0	0	0	0	10	0.2	8.531	0.297
7.0	8.0	16	3	0	0	0	0	0	0	0	0	0	19	0.4	7.496	0.300
6.0	7.0	16	6	0	0	0	0	0	0	0	0	0	22	0.5	6.567	0.285
5.0	6.0	24	4	0	1	0	0	0	0	0	0	0	29	0.6	5.489	0.277
4.0	5.0	36	9	5	0	0	0	0	0	2	0	0	52	1.1	4.427	0.266
3.0	4.0	85	23	12	6	2	3	0	0	0	0	0	131	2.8	3.413	0.278
2.0	3.0	211	64	21	9	8	1	0	0	0	0	0	314	6.7	2.435	0.232
1.0	2.0	668	241	64	21	5	0	4	0	[illegible]	0	0	1003	21.3	1.402	0.285
0.5	1.0	820	299	42	7	3	0	1	0	[illegible]	0	0	1172	24.8	0.730	0.143
0.0	0.5	1613	266	30	7	1	1	0	2	0	0	0	1920	40.7	0.244	0.144
TOTAL		3532	924	176	52	19	5	5	2	2	0	0	4717			
PERCENT		74.9	19.6	3.7	1.1	0.4	0.1	0.1	0.0	0.0	0.0	0.0				
MEAN		0.106	0.344	0.595	0.840	1.122	1.361	1.581	1.941	2.062	0.000	0.000				
ST. DEV		0.069	0.068	0.069	0.064	0.067	0.106	0.056	0.038	0.035	0.000	0.000				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - MINUTE SMEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 8 TO 10 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-1.25	1.25-1.50	1.50-1.75	1.75-2.00	2.00-3.00	3.00-5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	17	2	0	1	0	0	0	0	0	0	0	20	0.4	13.166	3.687
9.0	10.0	4	0	0	0	0	0	0	0	0	0	0	4	0.1	9.482	0.208
8.0	9.0	4	7	1	0	0	0	0	0	0	0	0	12	0.3	8.511	0.298
7.0	8.0	5	1	1	0	0	0	0	0	0	0	0	7	0.1	7.406	0.306
6.0	7.0	11	5	1	0	0	0	0	0	0	0	0	17	0.4	6.513	0.335
5.0	6.0	12	4	1	0	0	0	0	0	0	0	0	17	0.4	5.587	0.258
4.0	5.0	15	6	1	0	0	0	0	1	0	0	0	23	0.5	4.389	0.249
3.0	4.0	18	7	0	1	1	1	4	1	2	1	0	36	0.8	3.361	0.291
2.0	3.0	83	51	20	10	7	8	4	0	0	1	0	184	3.9	2.419	0.284
1.0	2.0	452	242	118	39	13	6	0	0	2	0	0	872	18.5	1.370	0.270
0.5	1.0	797	379	109	15	4	1	1	1	2	0	0	1309	27.7	0.721	0.138
0.0	0.5	1802	365	32	11	5	2	0	1	1	0	0	2219	47.0	0.234	0.141
TOTAL		3220	1069	284	77	30	18	9	4	7	2	0	4720			
PERCENT		68.2	22.6	6.0	1.6	0.6	0.4	0.2	0.1	0.1	0.0	0.0				
MEAN		0.108	0.351	0.597	0.857	1.113	1.362	1.638	1.910	2.369	3.186	0.000				
ST. DEV		0.070	0.068	0.070	0.075	0.066	0.072	0.075	0.052	0.300	0.018	0.000				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 10 TO 12 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-1.25	1.25-1.50	1.50-1.75	1.75-2.00	2.00-3.00	3.00-5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
9.0	10.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
8.0	9.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
7.0	8.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
6.0	7.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
5.0	6.0	3	0	0	0	0	0	2	1	1	0	0	7	0.2	5.370	0.174
4.0	5.0	5	1	0	3	3	5	1	0	1	1	0	20	0.4	4.376	0.260
3.0	4.0	13	9	15	6	7	2	2	4	8	1	0	67	1.5	3.370	0.282
2.0	3.0	75	42	34	24	10	16	16	8	4	0	0	229	5.1	2.388	0.272
1.0	2.0	416	240	166	79	62	23	9	3	1	0	0	999	22.2	1.385	0.269
0.5	1.0	687	363	102	28	4	4	0	1	1	2	0	1292	28.6	0.728	0.143
0.0	0.5	1368	421	73	15	1	6	1	3	7	1	0	1896	42.0	0.244	0.145
TOTAL		2567	1096	470	155	87	56	31	20	23	5	0	4510			
PERCENT		56.9	24.3	10.4	3.4	1.9	1.2	0.7	0.4	0.5	0.1	0.0				
MEAN		0.112	0.356	0.605	0.853	1.117	1.338	1.610	1.852	2.330	3.364	0.000				
ST. DEV		0.070	0.069	0.073	0.072	0.074	0.068	0.077	0.072	0.257	0.266	0.000				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

JIMSPHERE - MINUTE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 12 TO 14 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.000	0.000
9.0	10.0	0	0	0	0	0	0	0	0	0	2	1	3	0.1	9.243	0.225
8.0	9.0	0	0	0	0	0	0	0	0	0	2	1	3	0.1	8.594	0.400
7.0	8.0	0	0	1	0	0	0	1	0	0	3	0	5	0.1	7.517	0.248
6.0	7.0	0	0	0	0	0	0	1	0	1	2	0	4	0.1	6.554	0.240
5.0	6.0	0	0	0	2	0	1	1	0	3	7	0	14	0.3	5.492	0.324
4.0	5.0	4	2	4	3	2	3	0	2	8	6	0	34	0.8	4.450	0.252
3.0	4.0	24	23	12	14	5	14	4	5	12	6	0	119	2.9	3.409	0.257
2.0	3.0	76	67	54	32	28	23	16	18	17	5	1	337	8.1	2.430	0.294
1.0	2.0	290	225	198	140	66	46	15	5	1	4	0	990	23.7	1.411	0.284
0.5	1.0	422	336	177	66	14	9	3	0	3	2	1	1033	24.8	0.736	0.145
0.0	0.5	1131	389	79	12	5	4	1	0	6	1	0	1628	39.0	0.236	0.140
TOTAL		1947	1042	525	269	120	100	42	30	51	40	4	4170			
PERCENT		46.7	25.0	12.6	6.5	2.9	2.4	1.0	0.7	1.2	1.0	0.1				
MEAN		0.116	0.365	0.610	0.864	1.114	1.375	1.617	1.875	2.471	3.606	5.585				
ST. DEV		0.071	0.069	0.072	0.073	0.078	0.078	0.078	0.079	0.312	0.5	.314				

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 14 TO 16 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND) 0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	0	1	0	0	0	0	0	0	0	0	1	2	0.1	11.121	1.516
9.0	10.0	0	1	1	0	0	0	0	0	0	0	0	2	0.1	9.426	0.092
8.0	9.0	0	0	0	1	0	0	1	0	0	1	0	3	0.1	8.245	0.199
7.0	8.0	0	0	0	0	1	0	0	0	2	1	1	5	0.2	7.483	0.214
6.0	7.0	2	0	0	3	2	0	3	0	2	1	0	13	0.5	6.527	0.322
5.0	6.0	4	5	5	2	1	1	0	0	7	0	0	25	1.0	5.377	0.259
4.0	5.0	9	14	12	3	8	5	0	1	8	1	0	61	2.5	4.384	0.295
3.0	4.0	25	28	16	17	17	10	7	9	7	0	0	136	5.5	3.431	0.287
2.0	3.0	73	56	53	27	31	19	18	9	5	0	0	291	11.8	2.429	0.283
1.0	2.0	187	186	137	63	37	10	4	2	1	0	0	627	25.5	1.453	0.287
0.5	1.0	259	214	74	26	11	5	0	0	0	0	0	589	23.9	0.736	0.145
0.0	0.5	272	172	39	16	3	2	1	1	0	1	0	707	28.7	0.2[illegible]0	0.145
TOTAL		[illegible]31	677	337	158	111	52	34	22	32	5	2	2461			
PERCENT		41.9	27.5	13.7	6.4	4.5	2.1	1.4	0.9	1.3	0.2	0.1				
MEAN		0.118	0.362	0.606	0.861	1.113	1.361	1.607	1.842	2.389	3.957	5.758				
ST. DEV		0.072	0.069	0.067	0.067	0.074	0.081	0.077	0.073	0.219	0.695	0.887				

INTERVALS INCLUDE LOWER LIMIT BUT ARE LESS THAN UPPER LIMIT

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JIMSPHERE SHEAR - MINUTE SHEAR

FREQUENCY DISTRIBUTION FOR THE ALTITUDE RANGE 16 TO 18 KILOMETERS

DIRECTION CHANGE (DEGREES)		SPEED (METERS PER SECOND)														
		0.00 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1.00 1.25	1.25 1.50	1.50 1.75	1.75 2.00	2.00 3.00	3.00 5.00	5.00 PLUS	TOTAL	PERCENT	MEAN	ST. DEV
10.0	PLUS	2	0	3	0	1	0	0	1	0	2	0	9	1.6	13.379	3.504
9.0	10.0	2	1	0	0	0	0	0	0	0	0	0	3	0.5	9.473	0.366
8.0	9.0	0	4	0	1	0	0	0	0	0	0	1	6	1.1	8.436	0.170
7.0	8.0	0	1	0	1	0	0	0	0	1	0	0	3	0.5	7.638	0.060
6.0	7.0	0	4	1	1	0	0	0	0	0	2	0	8	1.4	6.645	0.251
5.0	6.0	6	1	2	0	0	0	0	0	1	0	0	10	1.8	5.428	0.321
4.0	5.0	8	2	7	2	2	2	1	0	1	0	0	25	4.4	4.398	0.270
3.0	4.0	5	8	12	7	5	1	3	1	1	2	0	45	8.0	3.357	0.268
2.0	3.0	34	33	18	6	8	5	1	2	0	1	0	108	19.2	2.446	0.290
1.0	2.0	47	45	23	20	10	3	1	0	1	0	0	150	26.7	1.456	0.282
0.5	1.0	40	22	17	4	1	1	0	0	2	0	0	87	15.5	0.762	0.142
0.0	0.5	54	34	13	3	0	2	0	0	0	2	0	108	19.2	0.248	0.142
TOTAL		198	155	96	45	27	14	6	4	7	9	1	562			
PERCENT		35.2	27.6	17.1	8.0	4.8	2.5	1.1	0.7	1.2	1.6	0.2				
MEAN		0.128	0.382	0.613	0.857	1.106	1.368	1.624	1.886	2.334	3.997	5.707				
ST. DEV		0.071	0.076	0.070	0.064	0.072	0.068	0.080	0.051	0.175	0.576	0.000				

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13. ABSTRACT

Characteristcs of the wind shear for 25 meter layers were prepared from a series of 175 detailed wind ascents to 18 km taken with a Jimsphere balloon followed by FPS-16 radar from November 1964 to June 1965. To determine how well the shears for small layers could be estimated from rawinsonde data, two new sets of ascents were created from the original Jimsphere data. One set consisted of wind data at 23 levels corresponding only to standard pressure levels, and the other set at the 46 "minute" levels at which winds are reported on observational forms. The differences in results were thus due only to the differing vertical resolution in the three series.

The results showed that the magnitudes of the mean pressure and minute shears for 25 meters are smoothed to about 1/3 and 1/2 respectively of the Jimsphere shears. Graphs of corrections for pressure and minute data needed to approximate the Jimsphere shear are presented both in terms of thickness of layer, and, for 25 m as a function of height.

The regressions proposed by Essenwanger between the mean, or the standard deviation, of the shear and the mean thickness of the layer, and also between the standard deviation and the mean of the shear are confirmed in principle using Jimsphere data.

Tabulations of bivariate frequency distributions (direction change vs magnitude), means and standard deviations of five parameters relating Jimsphere shears and winds to those of pressure and minute data, by 2 km layers, are included, both for the total data sample and for the time changes in a sub-set consisting of 59 pairs of observations taken from 1-4 hours apart.

The mean Jimsphere shear for a 25 meter layer increases from 0.3 m/sec at the lowest level, to 0.5 at 11 km and to 0.8 at 17 km, with a standard deviation of about 70% of the mean.

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